C-SERIES

Water Conditioning System Installation, Operation & Maintenance Manual

C-SERIES

The "C-Series" Features

- Solid State Microprocessor with Easy Front Panel Settings
- Three Modes of Operation…Meter Immediate, Meter Delayed, or Time Clock Delayed
- Double Backwash Feature, Offers Optimum Regeneration, Cleaning Ability, and Efficiency
- 36 Selectable Pre-programmed Regeneration Cycles
- Days Override Feature 1 - 28 Days Available
- Backwash and Brining Ability To 21" Diameter Tanks
- Downflow Regeneration
- Stores System Configuration and Operation Data In Non Volatile Memory
- Battery Back-up with up to 8 Hour Power Carry Over
- 12 Volt Transformer Provides Safe and Easy Installation
- Provides Optimum Service And Backwash Rates
- Treated Water Regenerant Refill

The "C" Series Control Valve Specifications

Inlet/Outlet	1",
Cycles	3 – 6
Valve Material	Noryl*

Flow Rates

Service @ 15 psi drop	
1" Valve (includes bypass and meter)	27gpm
1¼" Valve (includes meter)	34gpm
1¼" Valve (includes bypass & meter)	32gpm
Backwash @ 25 psi drop	
1" Valve (includes bypass and meter)	27gpm
1¼" Valve	32gpm
1¼" Valve (includes bypass)	30gpm
Cv Service	
1" Valve	7.0
1¼" Valve	8.8
Cv Backwash	
1" Valve	5.4
1¼" Valve	6.4

Operating Pressures

Minimum/Maximum	20 psi - 125 psi

Operating Temperatures

Minimum/Maximum	40°- 110°F
Regeneration	Downflow

Meter

Accuracy	±5%
Flow Rate Range	0.25 - 27 gpm,
Gallon Range	20 - 50,000

Dimensions

Distributor Pilot	1" (1.050) OD Pipe
Dist. Pilot (1¼" Valve)	1.32" OD Pipe, 32mm OD
Drain Line	3/4" or 1"
NPT Brine Line	3/8" or 1/2"
OD Poly Tube Mounting Base	2-1/2" – 8
NPSM Height from Top of Tank	7-3/8"
Weight	4-1/2 lbs.
Current Draw and Voltage	0.5A 110v

Tank Applications

Water Softener	6" – 21" Diameter
Water Filter**	6" – 24" Diameter

Cycles of Operation (Softener Downflow)

(1) - Backwash 1st(upflow)	6 – 12 Min.
(2) - Regenerant Draw (downflow)	45 – 75 Min.
(3) - Backwash 2nd(upflow)	3 – 12 Min.
(4) - Rinse (downflow)	3 – 8 Min.
(5) - Regenerant Refill (in service with treated water)	As Programmed
(6) - Service	

Options: Backwash Filter, 3/4", 1", & 1-1/4" inlet/outlet fittings available, Bypass, Weather Cover

Compatible with the following regenerants or chemicals: Sodium Chloride, Potassium Chloride, Potassium Permanganate, Sodium Bisulfite, Chlorine and Chloramines

** Noryl is a registered trademark of General Electric*

*** Filter tank size calculated @ 10 gpm per square foot of bed area*

C-SERIES *Job Specification Sheet*

Installation Date _____

Model Number _____

Water Test _____

Hardness _____ Iron _____ pH _____

Capacity of Unit _____

Type of Media _____ Cubic Feet _____

Installing Dealer _____

_____

_____

The "C" Series Control Valve

Thank you for purchasing one of the most versatile and simplistic water conditioners available. Your new water conditioner is designed to provide you and your family years of reliable service.

The electronic control valve featured on your system serves as the command center for your family's water conditioner. The control valve monitors your water usage and only regenerates when necessary. The control valve software provides your family with a constant supply of conditioned water and efficiently uses salt or other regenerates during the regeneration cycle.

Concerned with power failures? The control valve remembers all settings for two hours if the power goes out. After two hours, the only item that needs to be reset is the time of day; all other values are permanently stored in the nonvolatile memory.

Once your professional dealer has completed the installation of your new water conditioner and set the control valve, you are ready to enjoy the benefits of conditioned water.

Pre-Installation Checklist

1. **Inspect the unit** carefully for damage or shortage.
2. The unit should be located close to a clean working drain and **connected according to local plumbing codes.**
3. An **uninterrupted** alternating (A/C) supply is required. Please verify that your voltage supply is compatible with your unit before installation. **The current draw for this unit is 0.5 Amperes and the voltage is 110 volts.**
4. A **bypass valve** should be provided.
5. A **minimum of 20 psi of water pressure** is required for the valve to operate effectively.

CAUTION: *The water pressure is not to exceed 125 psi. The minimum operating temperature is 40°F (4°C). The maximum operating temperature is 110°F (38°C).*

Installation Checklist

1. Place the unit on a firm, level base. Since salt must be added to the brine tank for water softener installations, the location should be easily accessible.
2. All plumbing should be done in accordance with local plumbing codes. The pipe size for the drain should be a minimum of 1/2". Backwash flow rates in excess of 7 gpm or length in excess of 20' require 3/4" drain line.
3. Do not use Vaseline, oils, other hydrocarbon lubricants or spray silicone anywhere. A silicone lubricant may be used on black o-rings but is not necessary. **Avoid any type of lubricants, including silicone, on red or clear lip seals**.
4. Do not use pipe dope or other sealants on threads. Teflon tape must be used on the threads of the 1" NPT elbow or the 1/4" NPT connection and on the threads for the drain line connection. Teflon tape is not necessary on the nut connection or caps because of o-ring seals.
5. Solder joints near the drain must be done prior to connecting the drain line flow control fitting. Leave at least 6" between the drain line fitting and solder joints when soldering pipes that are connected on the drain line control fitting. Failure to do this could cause interior damage to the drain line flow control fitting.
6. When assembling the installation fitting package (inlet and outlet), connect the fitting to the plumbing system first and then attach the nut, split ring and o-ring. Heat from soldering or solvent cements may damage the nut, split ring or o-ring. Solder joints should be cool and solvent cements should be set before installing the nut, split ring and o-ring. Avoid getting primer and solvent cement on any part of the o-rings, split rings, bypass valve or control valve.
7. On units with a bypass, place in bypass position. Turn on the main water supply. Open a cold soft water tap nearby and let run a few minutes or until the system is free from foreign material that may have resulted from the installation. Once clean, close the water tap.
8. Place the bypass in service position and let water flow into the mineral tank. When water flow stops, slowly open a cold water tap nearby and let run until the air is purged from the unit. Then close tap.
9. Plug the valve into an approved power source. Note: All electrical connections must be connected according to local codes. **(Be certain the outlet is uninterrupted.)** Install grounding strap on metal pipes.
10. **It is not recommended to change control valves from downflow to upflow brining or vice versa in the field. The valve bodies for downflow and upflow are unique to the regeneration type and and should not be interchanged. A mismatch of valve body and regeneration piston will result in hard water bypass during service.**

Control Start-Up Procedures

The following outline includes a brief description of the functions of the buttons found on your control valve. A more detailed outline is included within this service manual.

Button Functions

SET CLOCK

The **"SET CLOCK"** button allows you to set the time of day, cancel out of the programming mode and saves changes when you are in the programming mode.

NEXT

The **"NEXT"** button allows you to toggle between capacity & time and moves you to the next display in the programming mode.

△ ▽

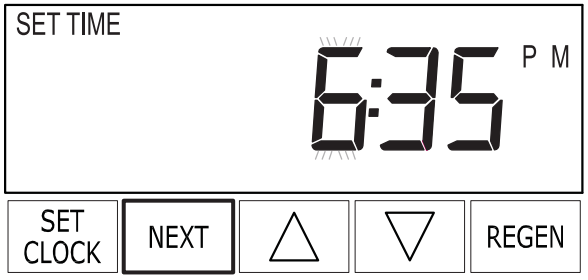
The **"ARROW"** buttons change the variable being displayed in the programming mode.

REGEN

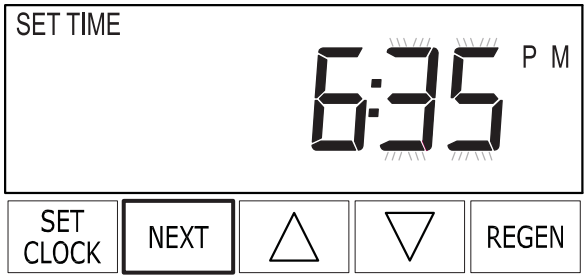
The **"REGEN"** button, when pressed once, will initiate a regeneration at the regeneration time input into the valve (usually at 2:00 am). When the **"REGEN"** button is held for more than three seconds, an immediate regeneration will be initiated. The **"REGEN"** button also backs you up one step in the programming mode.

Set Clock

The **"SET TIME"** programming mode is entered by simply pressing the **"SET CLOCK"** button.



Adjust the hours by pressing the ▼ or ▲ keys. Use care when verifying AM or PM. AM and PM will toggle after 12 AM. Once the hour is correctly set press the **"NEXT"** button to program the minutes.

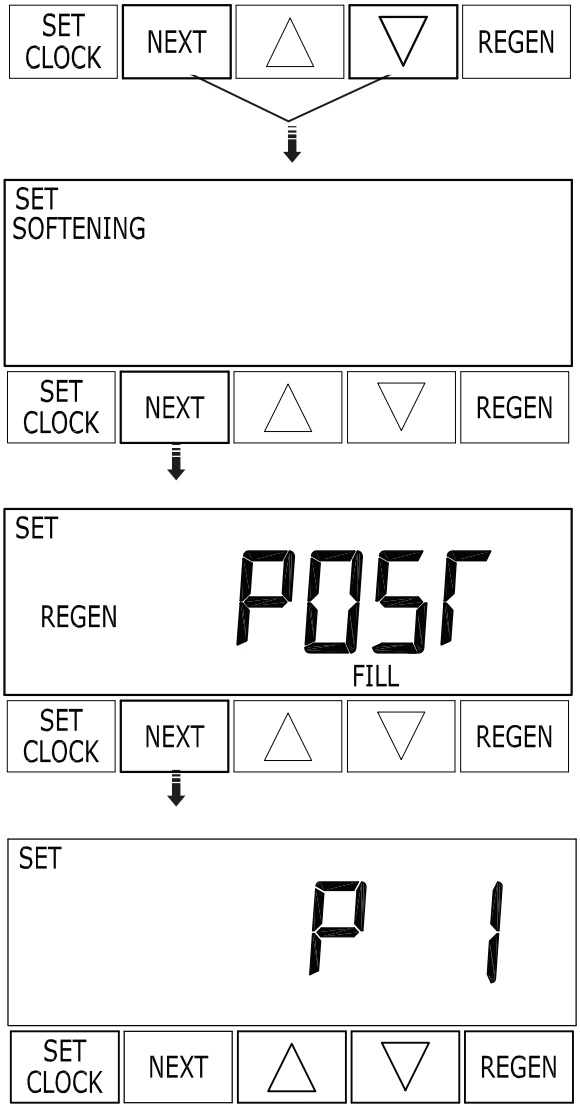


Adjust the minutes by pressing the ▼ or ▲ keys. Once the minutes are correctly set, press the **"NEXT"** button to return to normal operation.

Program Setup

NOTE: The programming on this page is for the *programmable cycle valves* only.

To determine if the control valve has programmable cycles, press "NEXT" and "REGEN" simultaneously. The board version will appear, if the board version starts with a "1" it is a standard electronics board, go to page 8 to continue setting up the control valve.
If the version begins with a "4" it has a programmable cycles, continue with the programming on this page to set up the control valve.



Press **"NEXT"** and ▼ buttons simultaneously for 3 seconds. If screen in Set Softening does not appear in 5 seconds the lock on the valve is activated. To unlock press ▼, **"NEXT"**, ▲, and **"SET CLOCK"** in sequence, then press **"NEXT"** and ▼ simultaneously for 3 seconds.

Choose Softening using ▼ or ▲ buttons. Press **"NEXT"** to go to Refill option. Press **"REGEN"** to exit Softener System Setup.

Set Refill option using ▼ or ▲ buttons:

- **"PoST"** to refill the brine tank after the final rinse; or
- **"PrE"** to refill the brine tank two hours before the regeneration time set.

Press **"NEXT"** to go to Program Code. Press **"REGEN"** to return to previous step.

Enter the desired program code from Page 5 or 6. Prior to selecting a Program Code, verify the correct valve body, main piston, regenerant piston, and stack are being used, and that the injector or injector plug(s) are in the correct locations. See page 28.

Note: Do not select P60 through P65 if using a 1¼" CS valve.

Press **"NEXT"** to go to Set hardness, Press **"REGEN"** to return to previous step.

Downflow Softener Program Codes

NOTE: The program codes listed on this page and the following page are for the *programable cycle valves* only, and should be used only as a guideline. Any program code listed can be applied to a softener or filter application for CS controls.

Program Code	Main Piston	1st Backwash	Brine/Slow Rinse	2nd Backwash	Fast Rinse
P1	Downflow	3	40	3	3
P2	Downflow	3	45	3	3
P3	Downflow	4	45	4	3
P4	Downflow	4	60	4	3
P5	Downflow	5	60	4	4
P6	Downflow	5	60	5	4
P7	Downflow	6	45	4	3
P8	Downflow	6	60	5	4
P9	Downflow	6	60	6	5
P10	Downflow	7	50	5	4
P11	Downflow	7	60	6	6
P12	Downflow	7	65	7	7
P13	Downflow	8	45	5	4
P14	Downflow	8	60	6	6
P15	Downflow	8	60	8	8
P16	Downflow	8	65	8	6
P17	Downflow	8	65	8	7
P18	Downflow	8	75	8	5
P19	Downflow	9	50	5	5
P20	Downflow	9	60	5	4
P21	Downflow	9	65	8	5
P22	Downflow	10	45	4	4
P23	Downflow	10	60	5	4
P24	Downflow	10	65	8	8
P25	Downflow	10	65	6	5
P26	Downflow	10	75	7	5
P27	Downflow	12	45	4	4
P28	Downflow	12	60	6	4
P29	Downflow	12	60	8	8
P30	Downflow	12	65	6	6
P31	Downflow	12	65	8	8
P32	Downflow	12	65	12	8
P33	Downflow	12	75	6	6
P34	Downflow	14	45	5	4
P35	Downflow	14	60	6	5
P36	Downflow	14	60	8	8
P37	Downflow	14	65	7	6
P38	Downflow	14	65	8	8
P39	Downflow	14	65	12	8
P40	Downflow	14	75	8	7
P41	Downflow	16	60	7	5
P42	Downflow	16	65	8	6
P43	Downflow	16	65	8	8
P44	Downflow	16	65	12	8
P45	Downflow	16	75	9	7

IMPORTANT: The program codes listed on this page are for the *programable cycle valves* only, and should be used only as a guideline. Any program code listed can be applied to a softener or filter application for CS controls.

Upflow Softener Program Codes for 1" or 1.25" CS Control

Program Code	Main Piston	1st Backwash	Brine/Slow Rinse	2nd Backwash	Fast Rinse
P60	Upflow	n/a	45	6	4
P61	Upflow	n/a	45	8	6
P62	Upflow	n/a	60	10	6
P63	Upflow	n/a	60	12	8
P64	Upflow	n/a	75	10	6
P65	Upflow	n/a	75	12	8

Regeneration Cycles Filtering for for 1" or 1.25" CS Control

Downflow Regenerant Refill After Rinse	Downflow Regenerant Refill	No Regenerant
1st Cycle: Backwash	1st Cycle: Fill	1st Cycle: Backwash
2nd Cycle: Regenerate	2nd Cycle: Service	2nd Cycle: Rinse
3rd Cycle: Second Backwash*	3rd Cycle: Backwash	3rd Cycle: Second Backwash*
4th Cycle: Rinse	4th Cycle: Regnerate	4th Cycle: Second Rinse
5th Cycle: Fill	5th Cycle: Second Backwash*	5th Cycle: Service
6th Cycle: Service	6th Cycle: Rinse	
	7th Cycle: Service	

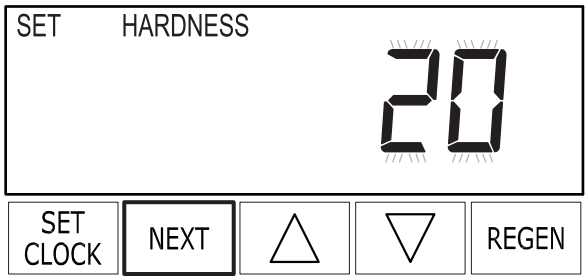
Regenerating Filter Program Codes for for 1" or 1.25" CS Control

Program Code	Main Piston	1st Backwash	Brine/Slow Rinse	2nd Backwash	Fast Rinse
P70	Downflow	6	20	6	6
P71	Downflow	12	10	n/a	12
P72	Downflow	4	50	n/a	4
P73	Downflow	10	50	n/a	6
P74	Downflow	12	60	n/a	10
P75	Downflow	12	75	n/a	10

Non-Regenerant Filter Program Codes for for 1" or 1.25" CS Control

Program Code	Main Piston	1st Backwash	Brine/Slow Rinse	2nd Backwash	Fast Rinse
P80	Downflow	8	8	n/a	n/a
P81	Downflow	12	6	n/a	n/a
P82	Downflow	14	8	n/a	n/a
P83	Downflow	14	10	n/a	n/a
P84	Downflow	16	10	n/a	n/a
P85	Downflow	18	10	n/a	n/a
P86	Downflow	20	10	n/a	n/a
P87	Downflow	8	6	10	8
P88	Downflow	12	6	12	10

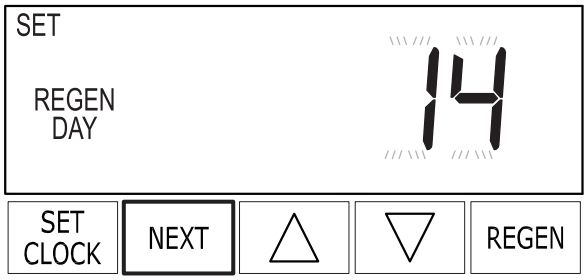
Set Hardness



The HARDNESS is entered into the control valve by pressing the **"NEXT"** and ▲ buttons simultaneously for 3 seconds.

The default HARDNESS setting is 20. The ▼ or ▲ buttons adjust the HARDNESS from 1 to 150. Press the **"NEXT"** button to advance to the SET DAY OVERRIDE function.

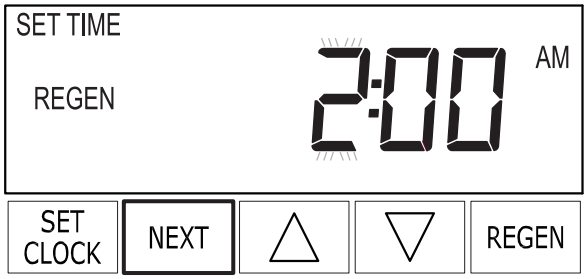
Set Day Override

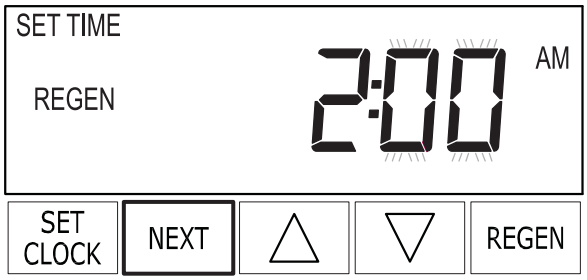


The control valve allows for a DAY OVERRIDE. This setting allows you to input the maximum number of days that can pass between regenerations.

The default DAY OVERRIDE is 14. The ▼ or ▲ buttons adjust the DAY OVERRIDE from 1 to 28 days. Press the **"NEXT"** button to advance to the TIME OF REGENERATION function.

Time of Regeneration



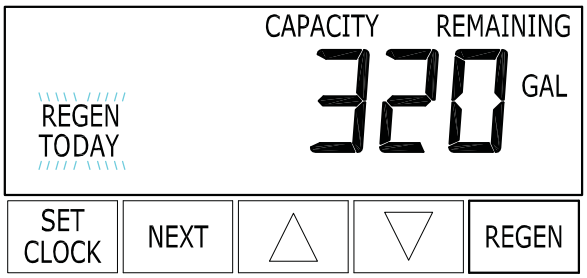


The TIME OF REGENERATION allows you to input the actual time you want the regeneration of your water conditioner to occur. Normally, water softeners regenerate at 2:00 AM and water filters regenerate at midnight.

The default TIME OF REGENERATION is 2:00 AM. Adjust the HOURS by pressing the ▼ or ▲ keys. Use care when verifying AM or PM. AM and PM will toggle after 12 AM. Once the HOUR is correctly set press the **"NEXT"** button to program the MINUTES.

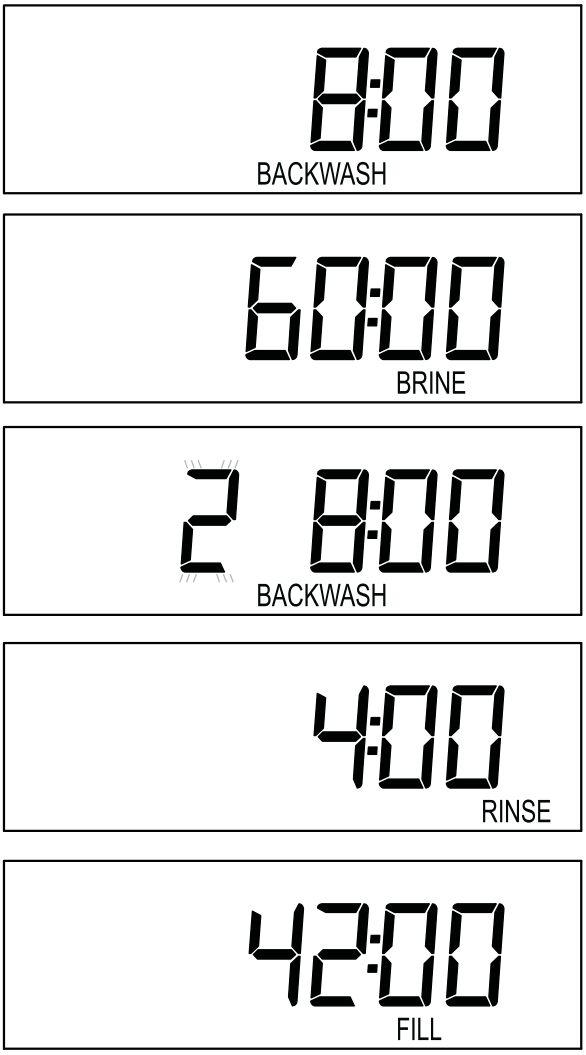
Adjust the MINUTES by pressing the ▼ or ▲ keys. Once the MINUTES are correctly set, press the **"NEXT"** button to return to normal operation.

Start an Immediate Extra Cycle



An IMMEDIATE EXTRA CYCLE can be initiated by simply pressing and holding the **"REGEN"** button for 3 seconds. The system will begin to regenerate immediately.

Fast Cycle Valve thru Regeneration



Once an IMMEDIATE EXTRA CYCLE is initiated by pressing and holding the **"REGEN"** button for 3 seconds, you can advance thru each step of the regeneration process. Simply press the **"REGEN"** button to advance thru each regeneration mode when the drive motor is not running.

Final Setup

With proper valve operation verified:

A. Add water to the top of the air check. Manually step the valve to the BRINE Mode and allow the valve to draw water from the brine tank until it stops. Note: The air check will check at approximately the mid-point of the screened intake area.

B. Next, manually step the valve to the FILL Mode Position and allow the valve to return to Service automatically.

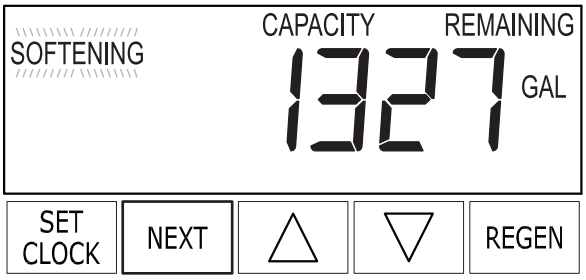
C. With the valve in SERVICE, check that there is about 1.0" of water above the grid in the brine tank, if used.

D. Fill the brine tank with salt.

E. Set-Up is now finished, the control can now be left to run automatically.

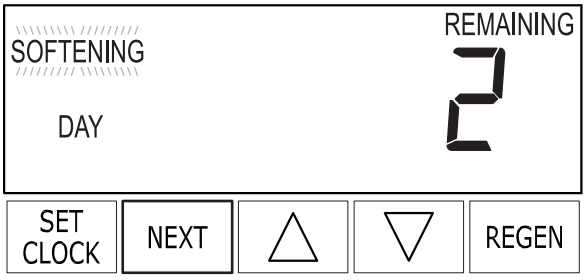
Flow Meters

In normal operation the Time Of Day will be displayed. The Volume Remaining Display can be viewed by simply pressing the "NEXT" button. This display will be in gallons. As treated water is used, the Volume Remaining Display will count down from a maximum value to zero or (--.--). Once this occurs a regeneration cycle will then be initiated immediately or delayed to the set Regeneration Time. Water flow through the valve is indicated by the flashing "SOFTENING" or "FILTERING" indication on the display screen as the turbine rotates. See illustration.



Time Clock Valves

In normal operation the Time Of Day display will be viewed at all times. The control will operate normally until the number of days since the last regeneration reaches the Regeneration Day Override setting. Once this occurs, a regeneration cycle will then be initiated at the preset Regeneration Time.



Immediate Regeneration Valves With Days Between Regeneration Override Set

When the valve reaches its set Days Since Regeneration Override value a regeneration cycle will be initiated immediately. This event occurs regardless of the Volume Remaining display having reached zero gallons.

Delayed Regeneration Valves With Days Between Regeneration Override Set

When the valve reaches its set Days Since Regeneration Override value a regeneration cycle will be initiated at the preset Regeneration Time. This event occurs regardless of the Volume Remaining display having reached zero gallons.

Control Operation During Regeneration

In Regeneration the control will display a special Regeneration Display. In this display the control will show the current regeneration step number the valve is advancing to, or has reached, and the time remaining in that step. The step number displayed will flash until the valve has completed driving to this regeneration step position. Once all regeneration steps have been completed the valve will return to Service and resume normal operation.

For Example, Pushing the NEXT Button during a regeneration cycle will immediately advance the valve to the next cycle step position and resume normal step timing.

Control Operation During Programming

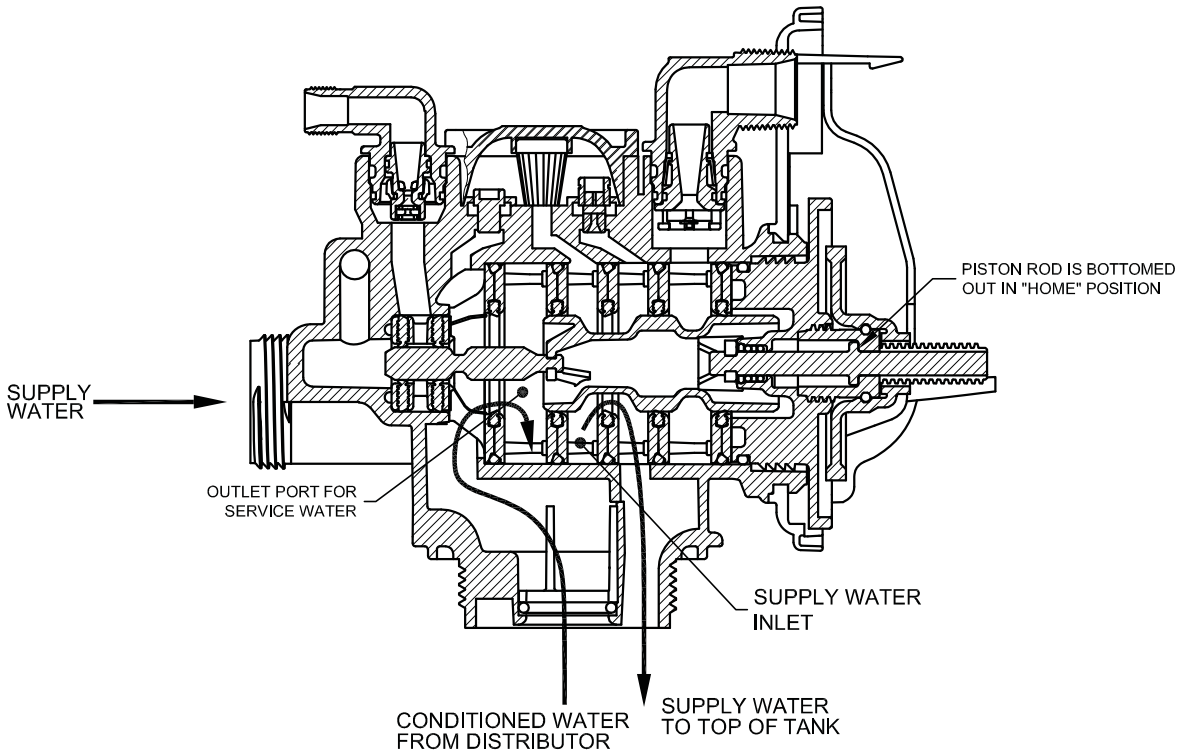
The control will only enter the Program Mode with the valve in Service. While in the Program Mode the control will continue to operate normally monitoring water usage and keeping all displays up to date. Control programming is stored in memory permanently, without the need for battery backup power.

Control Operation During A Power Failure

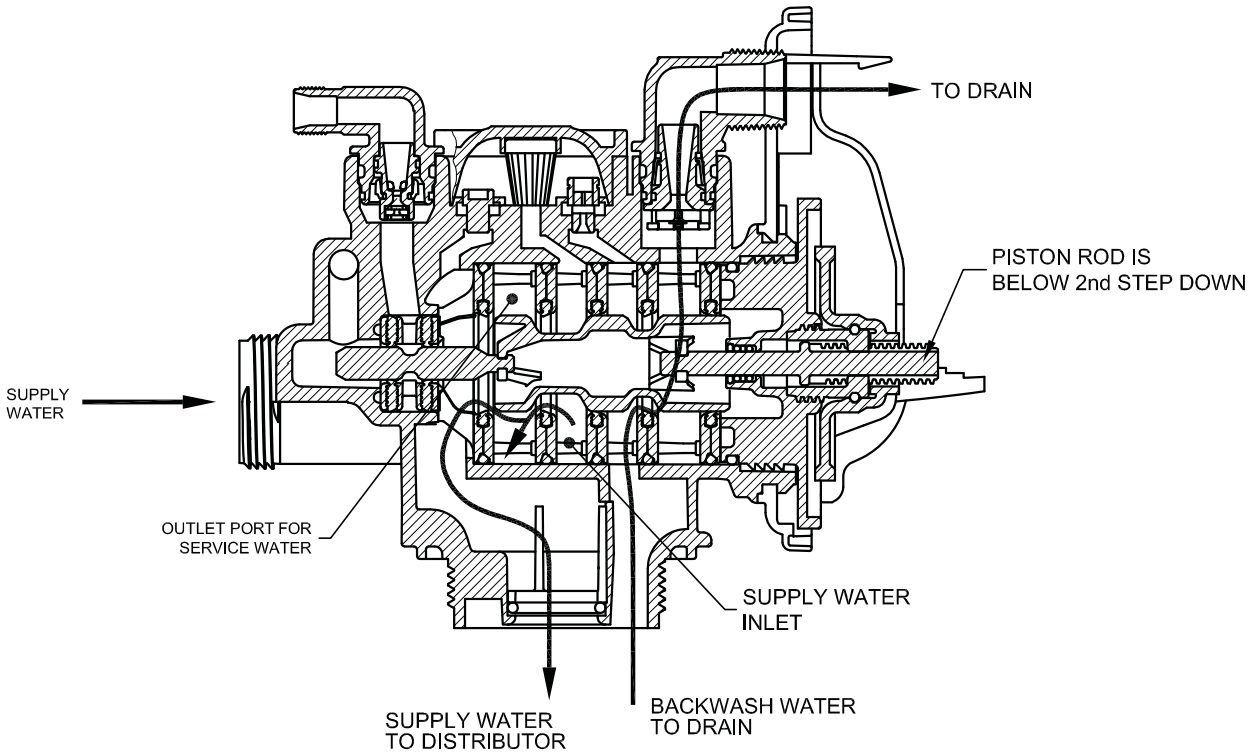
During a power failure all control displays and programming will be stored for use upon power reapplication. The control will retain these values for years. If necessary, without loss. The control will be fully inoperative and any calls regeneration will be delayed. The control will upon power re-application resume normal operation from the point where it was interrupted. An indication that a power outage has occurred will be an inaccurate time of day display.

Flow Diagrams

Service

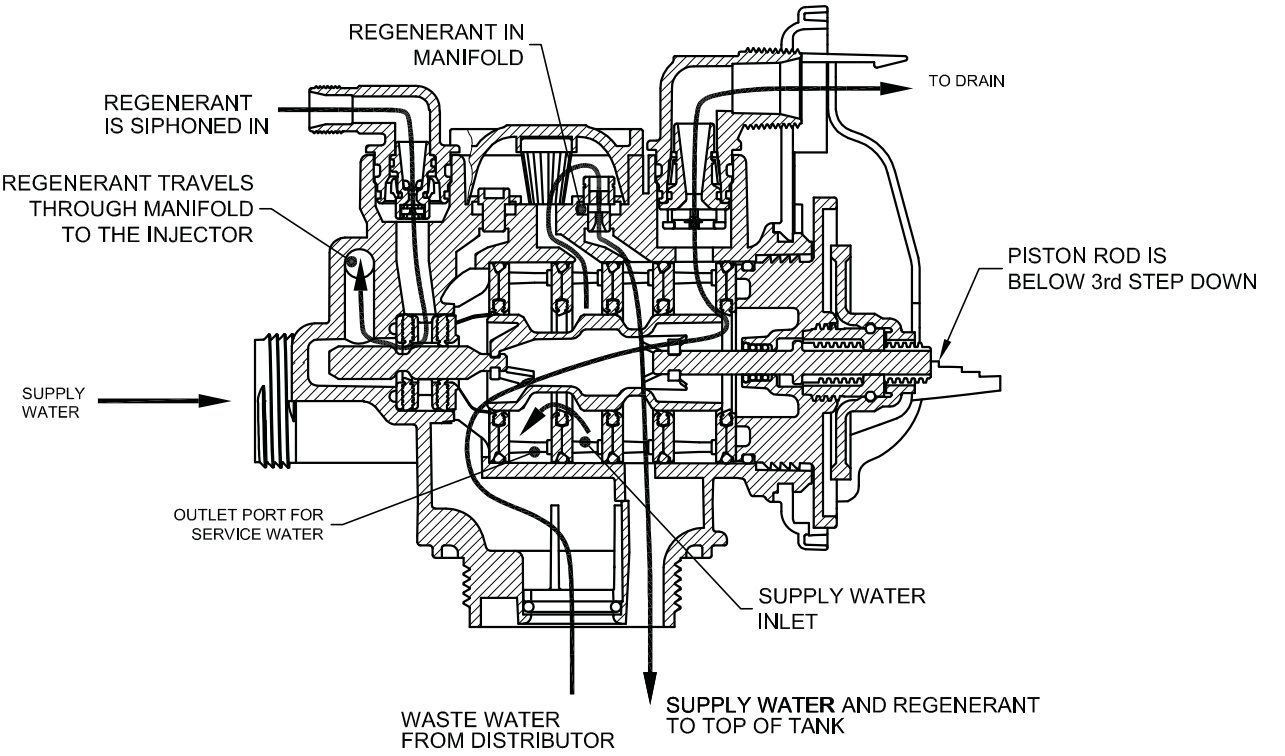

PISTON ROD IS BOTTOMED OUT IN "HOME" POSITION
SUPPLY WATER
OUTLET PORT FOR SERVICE WATER
SUPPLY WATER INLET
CONDITIONED WATER FROM DISTRIBUTOR
SUPPLY WATER TO TOP OF TANK

Backwash

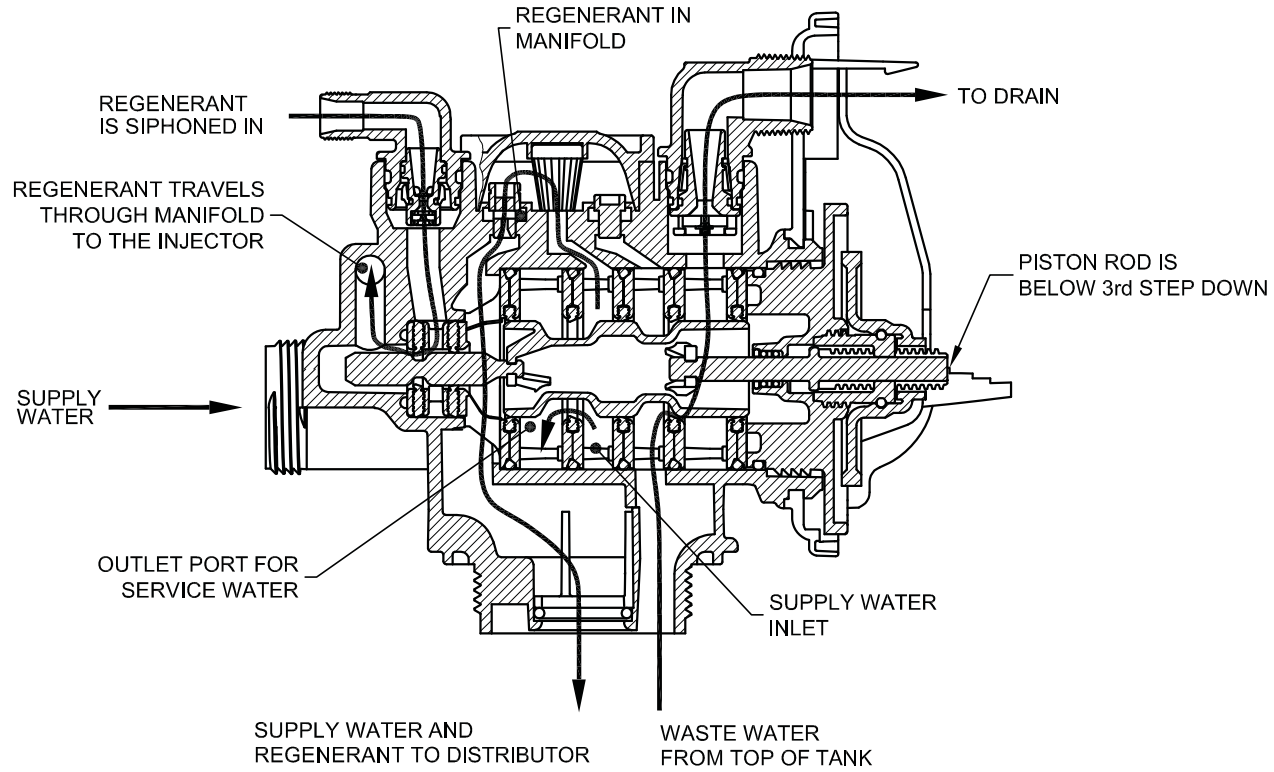


Flow Diagrams

Downflow Brine

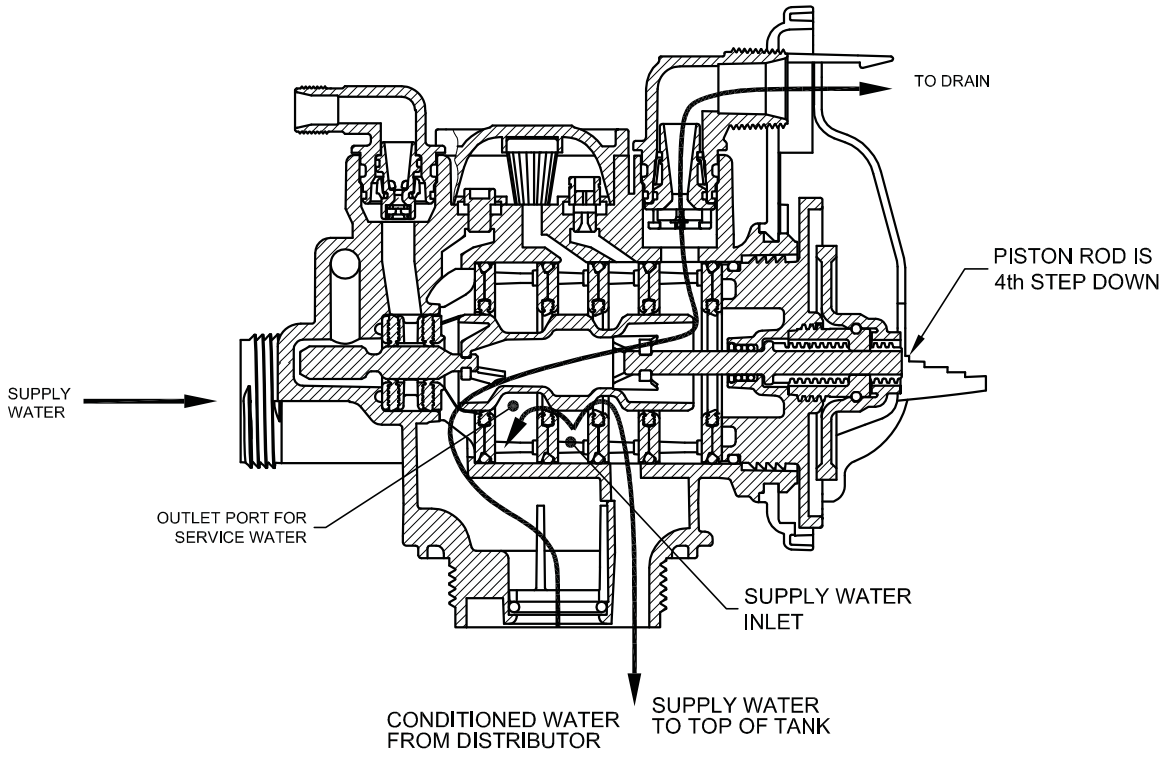

REGENERANT IN MANIFOLD
TO DRAIN
REGENERANT IS SIPHONED IN
REGENERANT TRAVELS THROUGH MANIFOLD TO THE INJECTOR
PISTON ROD IS BELOW 3rd STEP DOWN
SUPPLY WATER
OUTLET PORT FOR SERVICE WATER
SUPPLY WATER INLET
WASTE WATER FROM DISTRIBUTOR
SUPPLY WATER AND REGENERANT TO TOP OF TANK

Upflow Brine

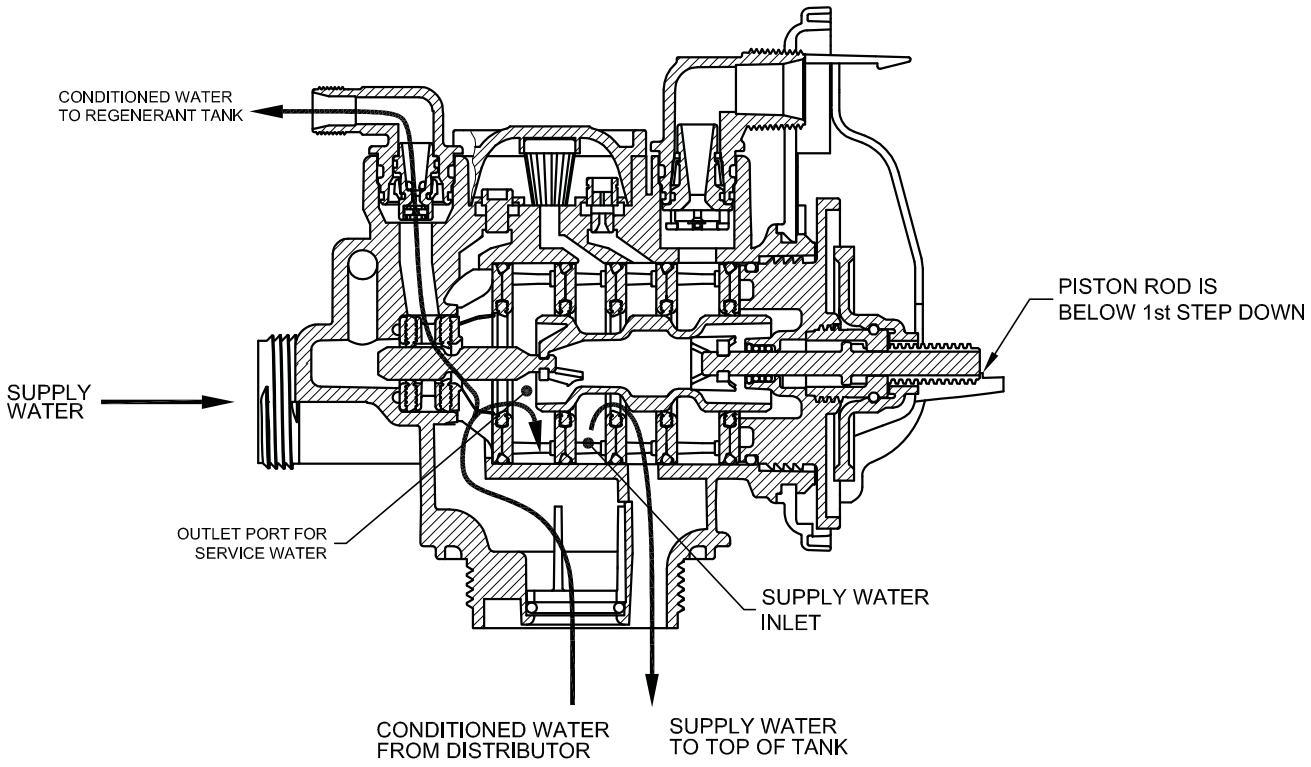

REGENERANT IN MANIFOLD
TO DRAIN
REGENERANT IS SIPHONED IN
REGENERANT TRAVELS THROUGH MANIFOLD TO THE INJECTOR
PISTON ROD IS BELOW 3rd STEP DOWN
SUPPLY WATER
OUTLET PORT FOR SERVICE WATER
SUPPLY WATER INLET
SUPPLY WATER AND REGENERANT TO DISTRIBUTOR
WASTE WATER FROM TOP OF TANK

Flow Diagrams

Rinse



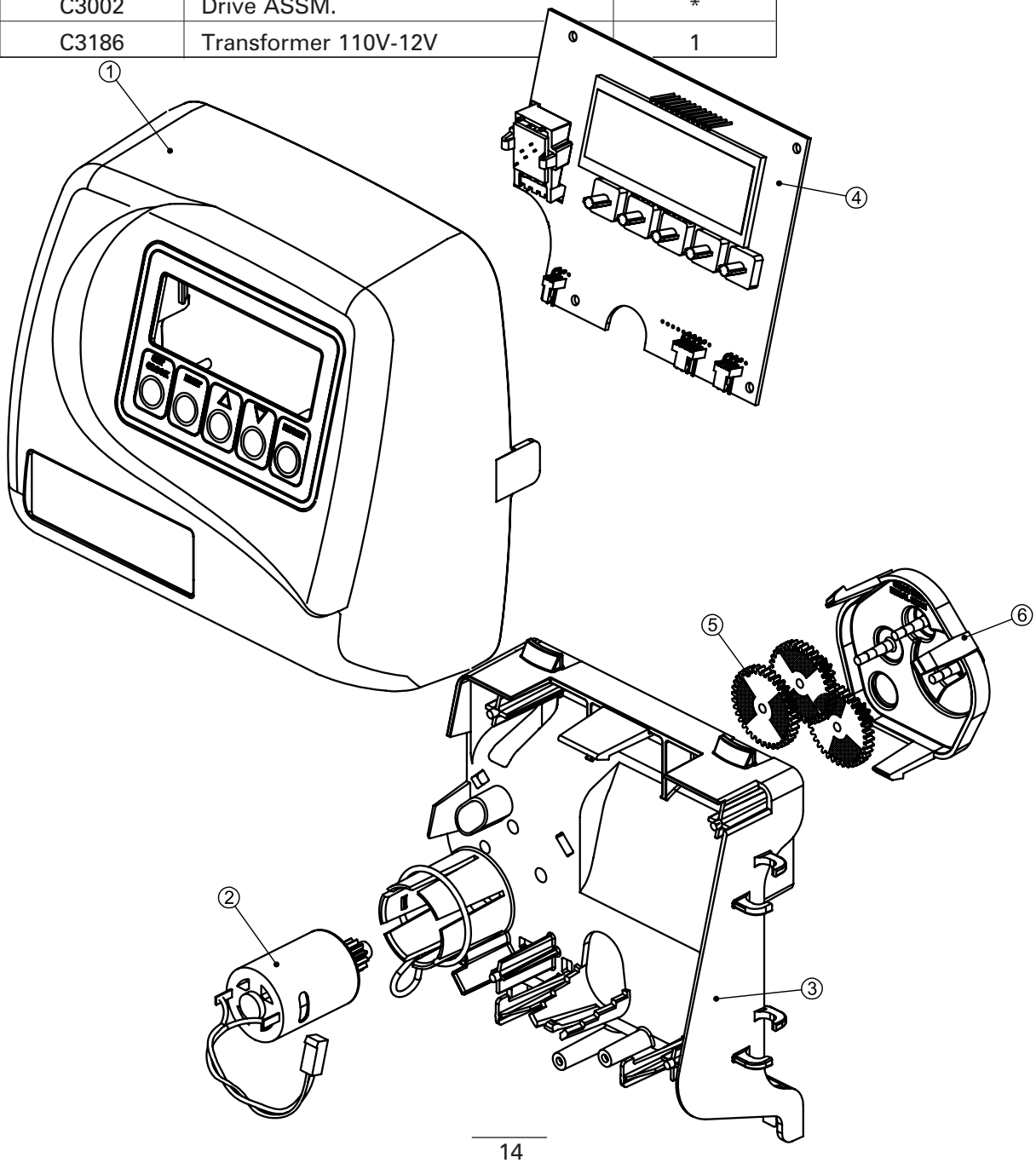
Fill



Front Cover & Drive Assemblies

No.	Part No.	Description	Quantity
1	C3175-01	Front Cover ASSM.	1
2	C3107-01	Motor	1
3	C3106-01	Drive Bracket & Spring Clip	1
4	C3108	PC Board	1
4	C3108CS	CS Version PC Board	1
4	C3108TC	PC Board (Time Clock)	1
4	C3108-09	PC Board w/Battery Backup	1
5	C3110	Drive Gear 12x36	3
6	C3109	Drive Gear Cover	1
	C3002	Drive ASSM.	*
N/S	C3186	Transformer 110V-12V	1

* Drawing number parts 2 through 6 may be purchased as a complete assembly, part C3002.



Drive Cap Piston, & Stack Spacer Assembly

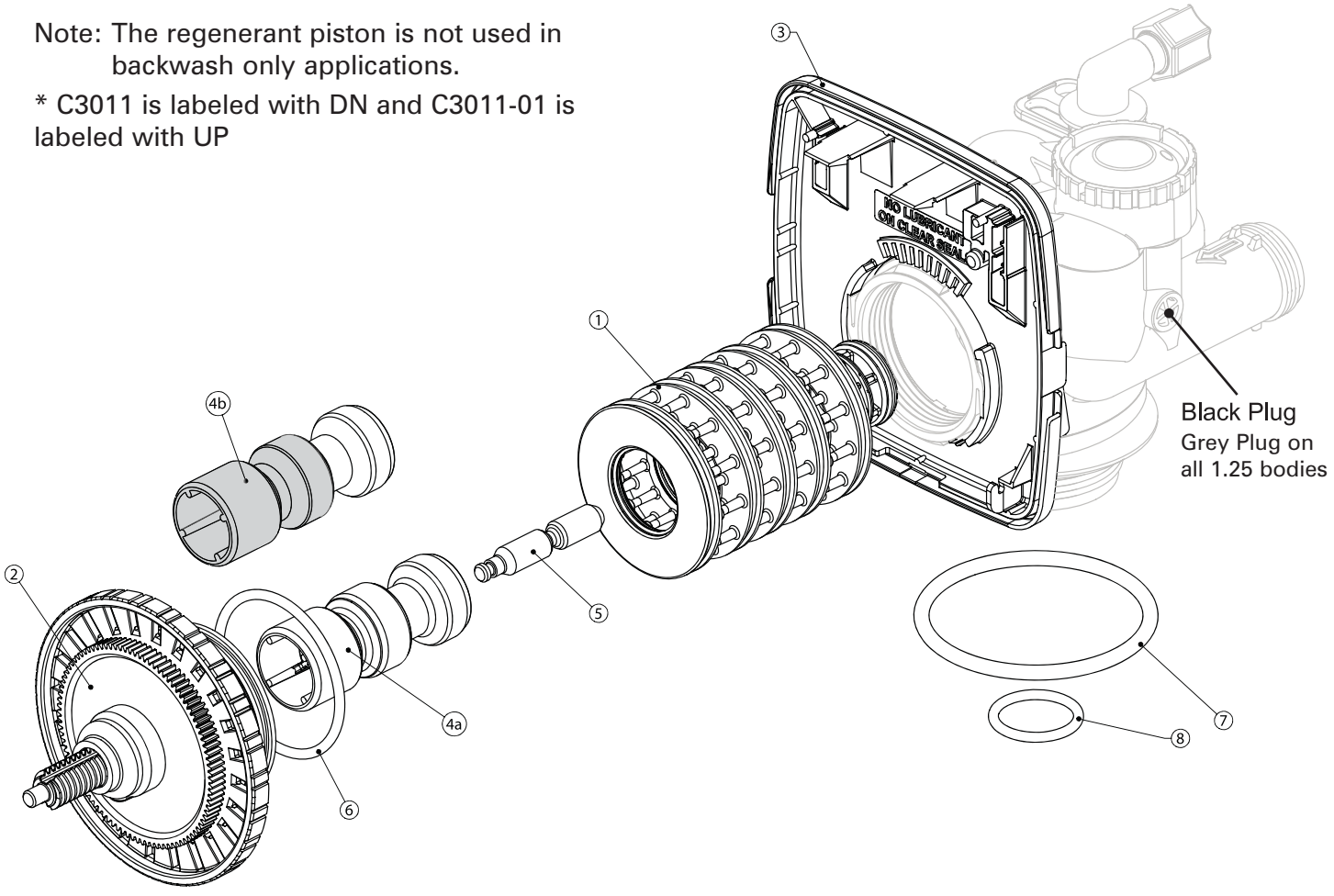
No.	Part No.	Description	Quantity
1	C3005	Spacer Stack Assembly	1
2	C3004	Drive Cap ASSM.	1
3	C3178	C-Series Backplate	1
4a	C3011*	Piston Downflow Assm.	1
4b	C3011-01*	Piston Upflow Assm.	1
5	C3174	Regenerant Piston	1
6	C3135	O-ring 228	1
7	C3180	O-ring 337	1
8	C3105	O-ring 215 (Distributor Tube)	1

1-1/2" Valve

No.	Part No.	Description	Quantity
1	C3430	1.5" Spacer Stack Assembly	1
4a	C3407	1.5" Piston Downflow Assm.	1
8	C3358	O-ring 219 Dist. Tube Opening 1.32"	1
8	C3357	O-ring 218 Dist. Tube Opening 32mm	1

Note: The regenerant piston is not used in backwash only applications.

* C3011 is labeled with DN and C3011-01 is labeled with UP

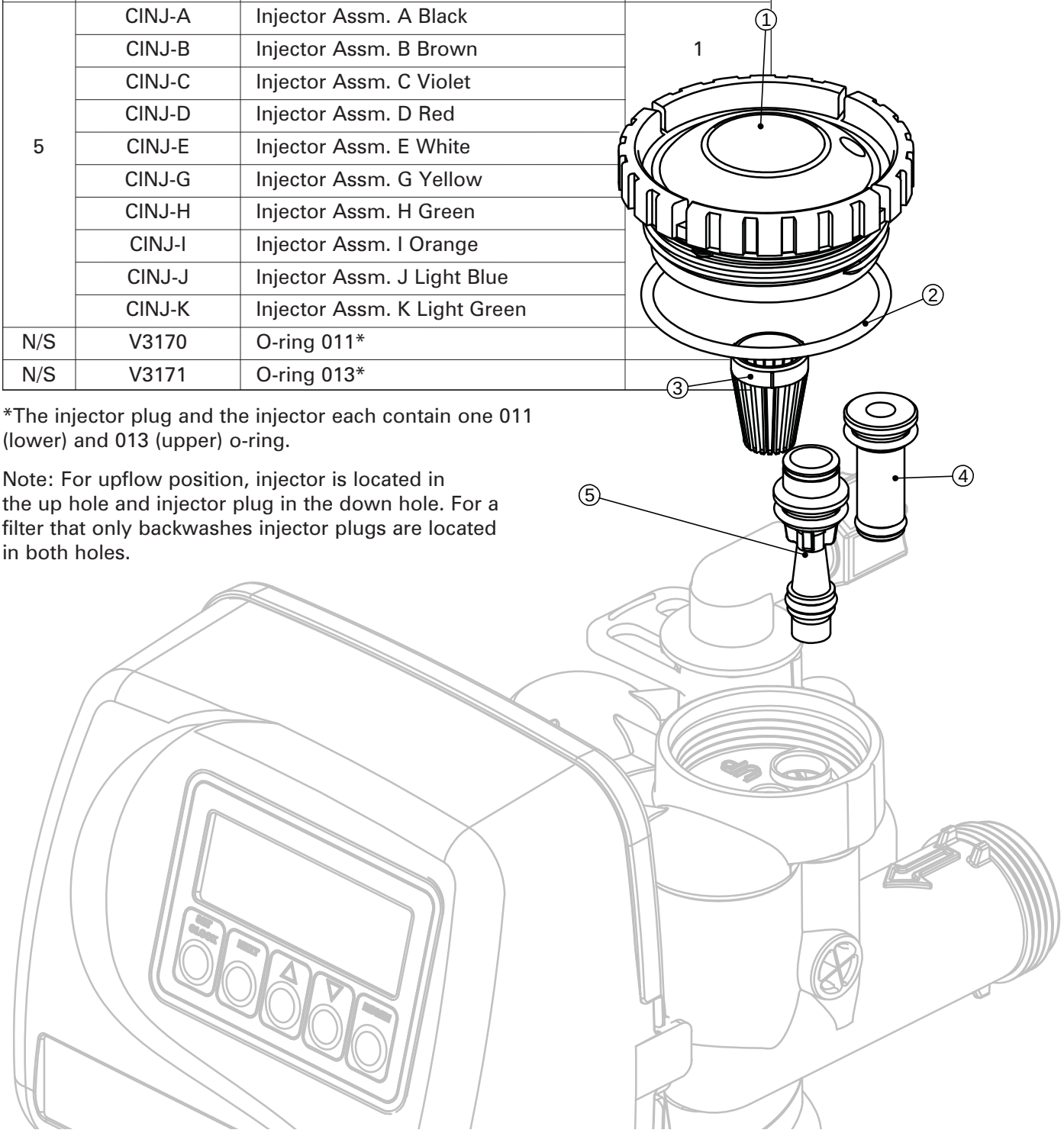


Injector Screen, Plug, & O-ring Assembly

No.	Part No.	Description	Quantity
	C3175-01	Front Cover ASSM.	1
1	C3176	Injector Cap	1
2	C3152	O-ring 135	1
3	CINJ-SCREEN	Injector Screen	1
4	CINJ-PLUG	Injector Assm. Z Plug	1
5	CINJ-A	Injector Assm. A Black	1
	CINJ-B	Injector Assm. B Brown	
	CINJ-C	Injector Assm. C Violet	
	CINJ-D	Injector Assm. D Red	
	CINJ-E	Injector Assm. E White	
	CINJ-G	Injector Assm. G Yellow	
	CINJ-H	Injector Assm. H Green	
	CINJ-I	Injector Assm. I Orange	
	CINJ-J	Injector Assm. J Light Blue	
	CINJ-K	Injector Assm. K Light Green	
N/S	V3170	O-ring 011*	
N/S	V3171	O-ring 013*	

*The injector plug and the injector each contain one 011 (lower) and 013 (upper) o-ring.

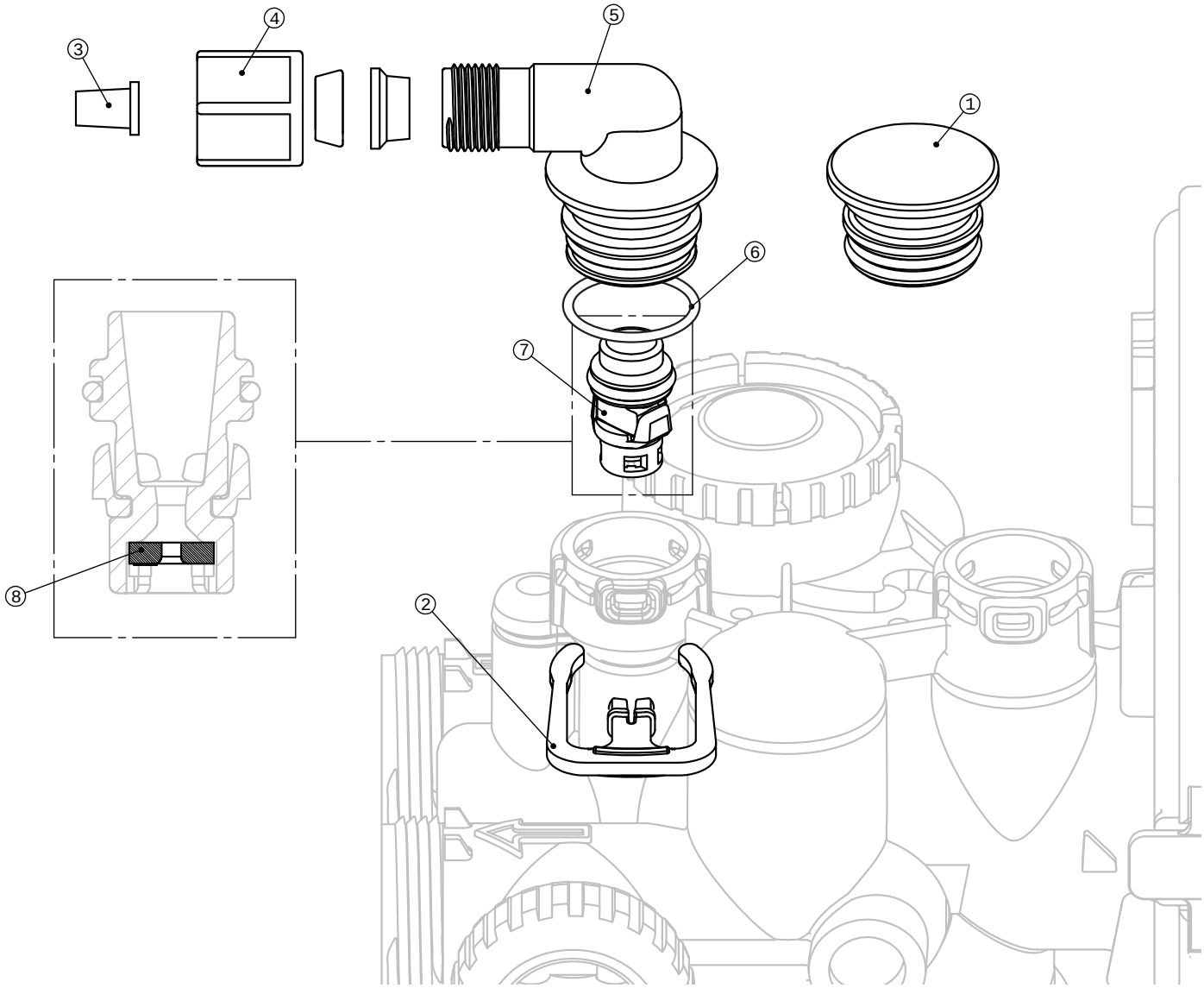
Note: For upflow position, injector is located in the up hole and injector plug in the down hole. For a filter that only backwashes injector plugs are located in both holes.



Refill & Refill Port Plug

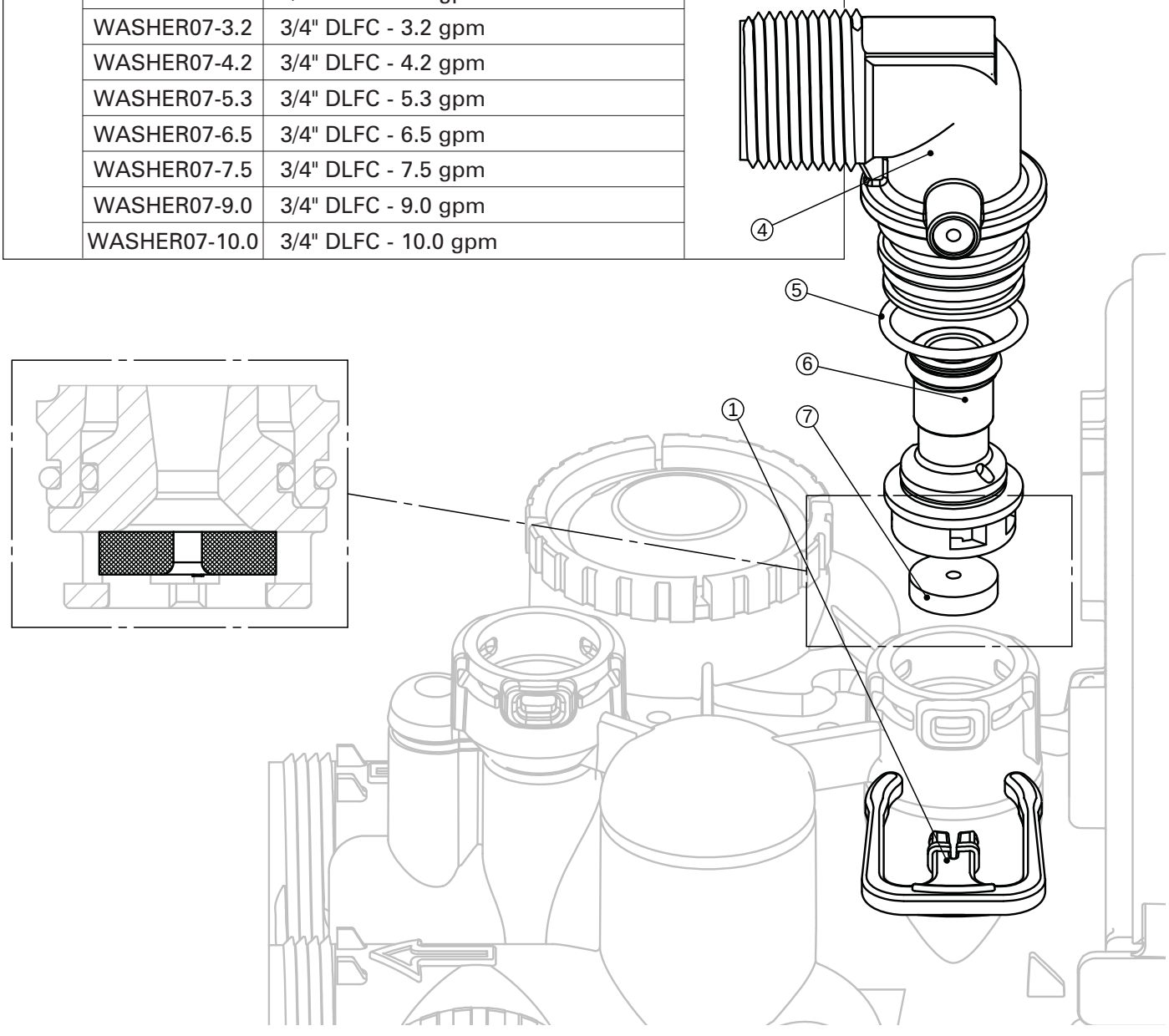
No.	Part No.	Description	Quantity
1	C3195-01	Refill Port Plug Assm.	**
2	C4615	Elbow Locking Clip	1
3	BCF03TS	Polytube Brass Insert 3/8	1
4	FL19625	3/8 Nut	1
5	C4613	Elbow Cap 3/8	1
6	C3163	0-ring 019	1
7	C3165-01	RFC Retainer Assm.	1
8	C3182	RFC	1

**This part is required for backwash only systems



3/4" Drain Line Flow Control Assembly

No.	Part No.	Description	Quantity
1	C3195-01	Refill Port Plug Assm.	**
1	H4615	Elbow Locking Clip	1
2	V3158-01	Drain Elbow æ Male ASSM.	1
3	V3163	0-ring 019	1
4	V3159-01	DLFC Retainer ASSM.	1
5	WASHER07-0.7	3/4" DLFC - 0.7 gpm	One DLFC must be used if 3/4" fitting is used
	WASHER07-1.0	3/4" DLFC - 1.0 gpm	
	WASHER07-1.3	3/4" DLFC - 1.3 gpm	
	WASHER07-1.7	3/4" DLFC - 1.7 gpm	
	WASHER07-2.2	3/4" DLFC - 2.2 gpm	
	WASHER07-2.7	3/4" DLFC - 2.7 gpm	
	WASHER07-3.2	3/4" DLFC - 3.2 gpm	
	WASHER07-4.2	3/4" DLFC - 4.2 gpm	
	WASHER07-5.3	3/4" DLFC - 5.3 gpm	
	WASHER07-6.5	3/4" DLFC - 6.5 gpm	
	WASHER07-7.5	3/4" DLFC - 7.5 gpm	
	WASHER07-9.0	3/4" DLFC - 9.0 gpm	
	WASHER07-10.0	3/4" DLFC - 10.0 gpm	

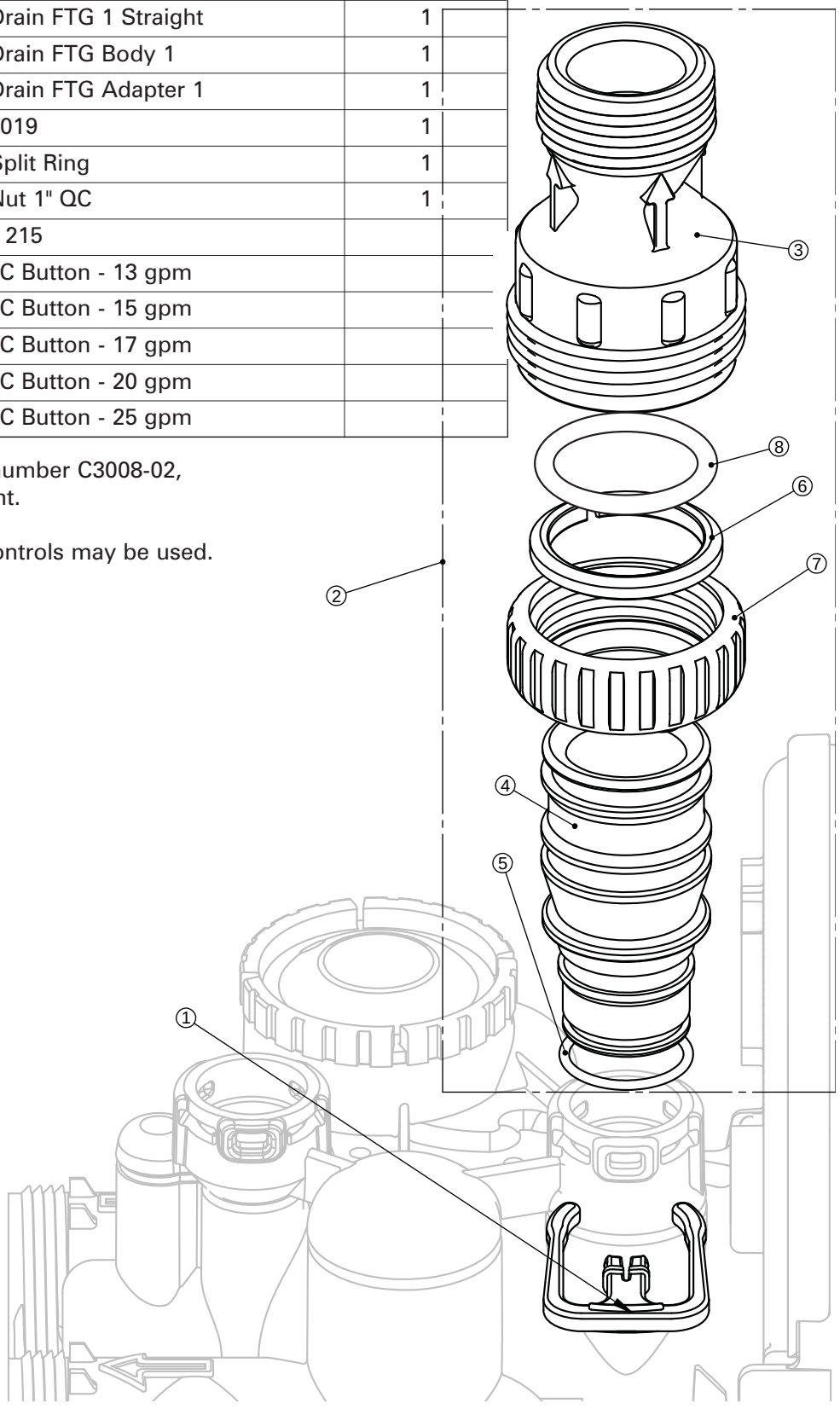


1" Drain Line Flow Control Assembly

No.	Part No.	Description	Quantity
1	H4615	Elbow Locking Clip	1
2	V3008-02	WS1 Drain FTG 1 Straight	1
3*	V3166	WS1 Drain FTG Body 1	1
4*	V3167	WS1 Drain FTG Adapter 1	1
5*	V3163	0-ring 019	1
6*	V3150	WS1 Split Ring	1
7*	V3151	WS1 Nut 1" QC	1
8*	V3105	O-ring 215	
	WASHER10-13.0	1" DLFC Button - 13 gpm	
	WASHER10-15.0	1" DLFC Button - 15 gpm	
	WASHER10-17.0	1" DLFC Button - 17 gpm	
	WASHER10-20.0	1" DLFC Button - 20 gpm	
	WASHER10-25.0	1" DLFC Button - 25 gpm	

* Can be ordered as a set order number C3008-02, description: Drain FTG 1 Straight.

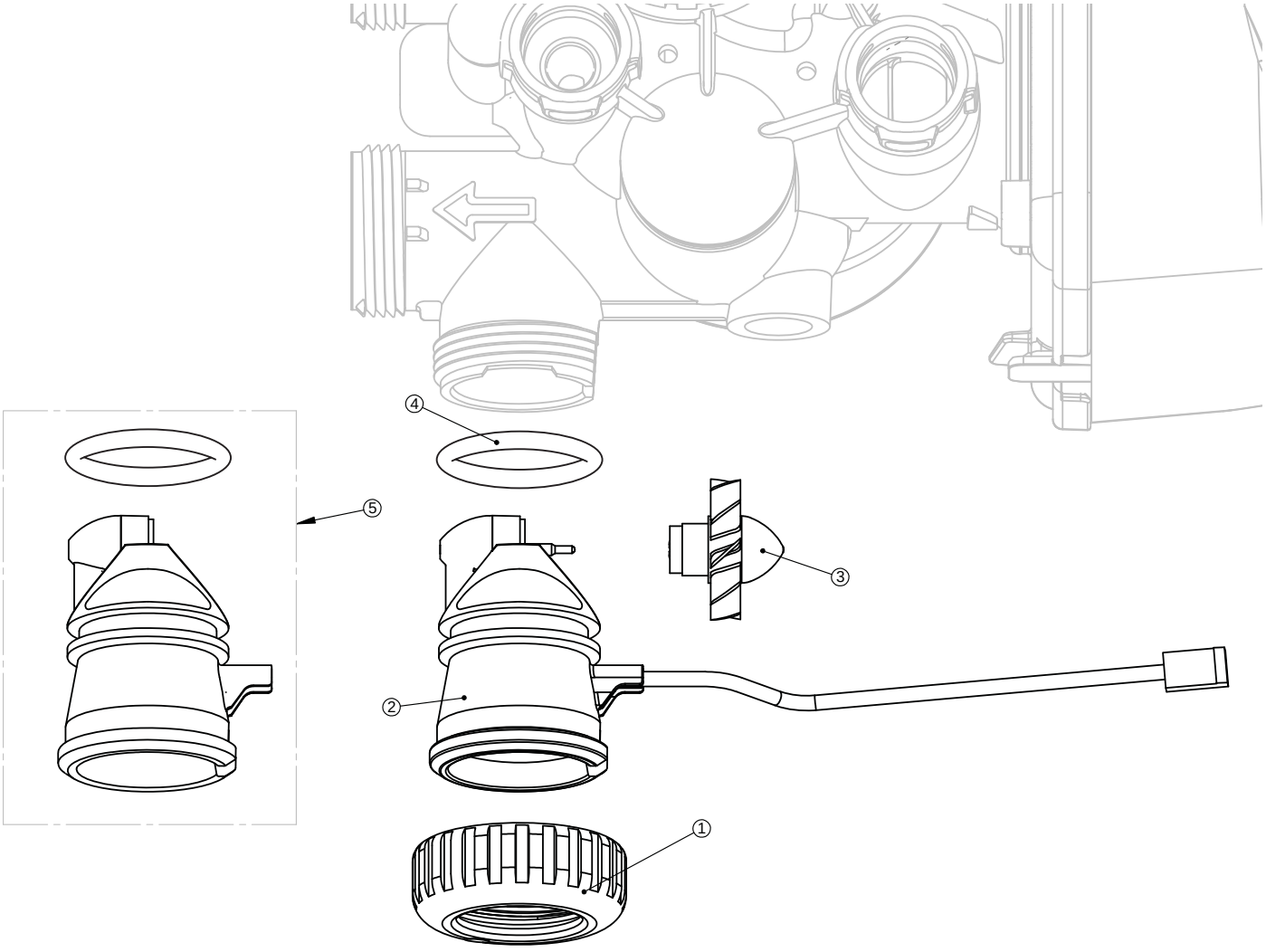
NOTE: 3/4" or 1" External Flow Controls may be used.



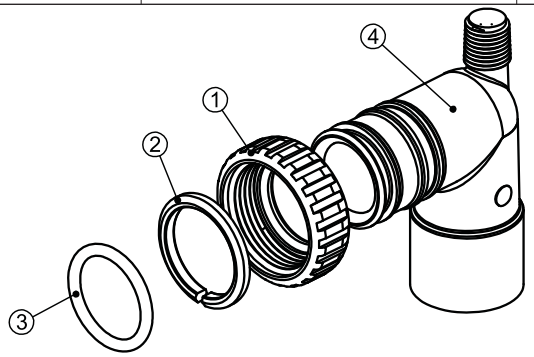
Water Meter & Meter Plug

No.	Part No.	Description	Quantity
1	C3151	Nut 1" QC	1
2	C3003*	Meter ASSM.	1
3	C3118-01	Turbine ASSM.	1
4	C3105	0-ring 215	1
5	C3003-01	Meter Plug ASSM.	1

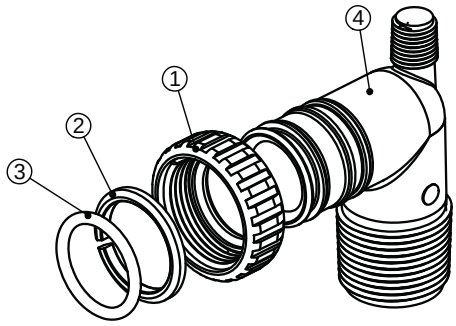
*Order number C3003 includes C3118-01 and C3105.



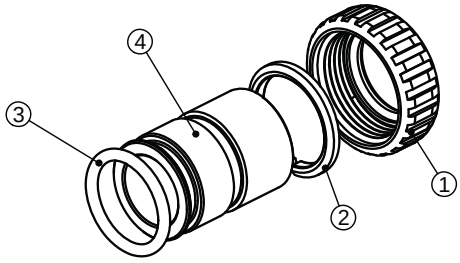
C0710-PVC – 3/4" x 1" PVC Solvent 90° Assembly			
No.	Part No.	Description	Qty.
1	C3151	Nut 1" Quick Connect	2
2	C3150	Split Ring	2
3	C3105	O-Ring 215	2
4	C3189	Fitting 3/4" x 1" PVC Solvent 90°	2



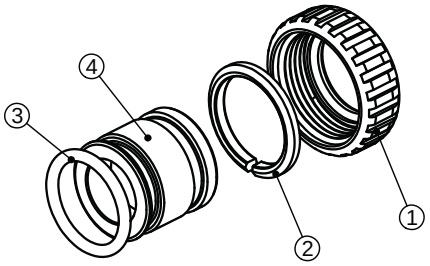
C10-PVC – 1" PVC Male NPT Elbow Assembly			
No.	Part No.	Description	Qty.
1	C3151	Nut 1" Quick Connect	2
2	C3150	Split Ring	2
3	C3105	O-Ring 215	2
4	C3149	Fitting 1" PVC Male NPT Elbow	2



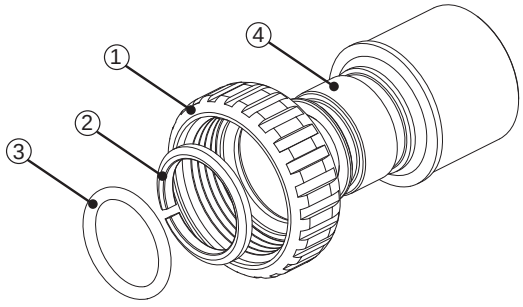
C07-CT – 3/4" Brass Sweat Assembly			
No.	Part No.	Description	Qty.
1	C3151	Nut 1" Quick Connect	2
2	C3150	Split Ring	2
3	C3105	O-Ring 215	2
4	C3188-01	Fitting 3/4" x 1" PVC Solvent 90°	2



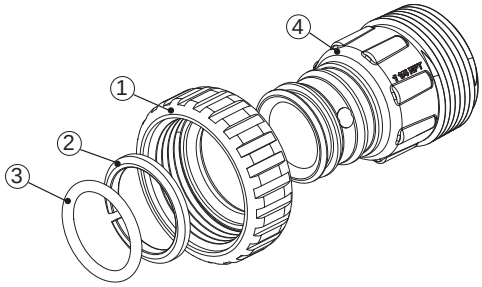
C10-PVC – 1" Brass Sweat Assembly			
No.	Part No.	Description	Qty.
1	C3151	Nut 1" Quick Connect	2
2	C3150	Split Ring	2
3	C3105	O-Ring 215	2
4	C3188	Fitting 3/4" x 1" PVC Solvent 90°	2



C12-CT – 1¼" & 1½" Brass Sweat Assembly			
No.	Part No.	Description	Qty.
1	C3151	Nut 1" Quick Connect	2
2	C3150	Split Ring	2
3	C3105	O-Ring 215	2
4	C3375	Fitting 1¼" & 1½" Brass Sweat	2

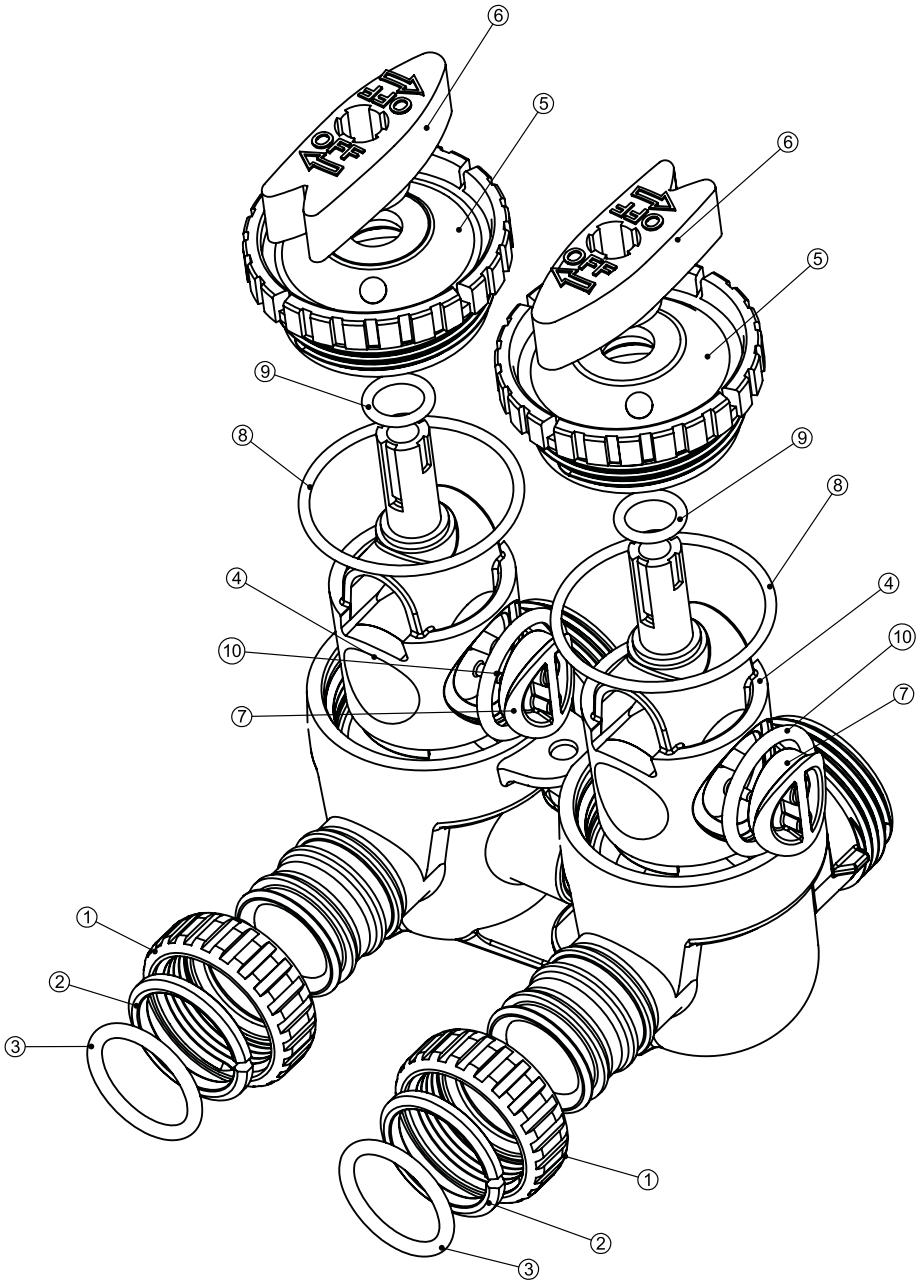


C12S-PVC – 1¼" PVC Male Assembly			
No.	Part No.	Description	Qty.
1	C3151	Nut 1" Quick Connect	2
2	C3150	Split Ring	2
3	C3105	O-Ring 215	2
4	C3317	Fitting 1¼" PVC Male NPT	2



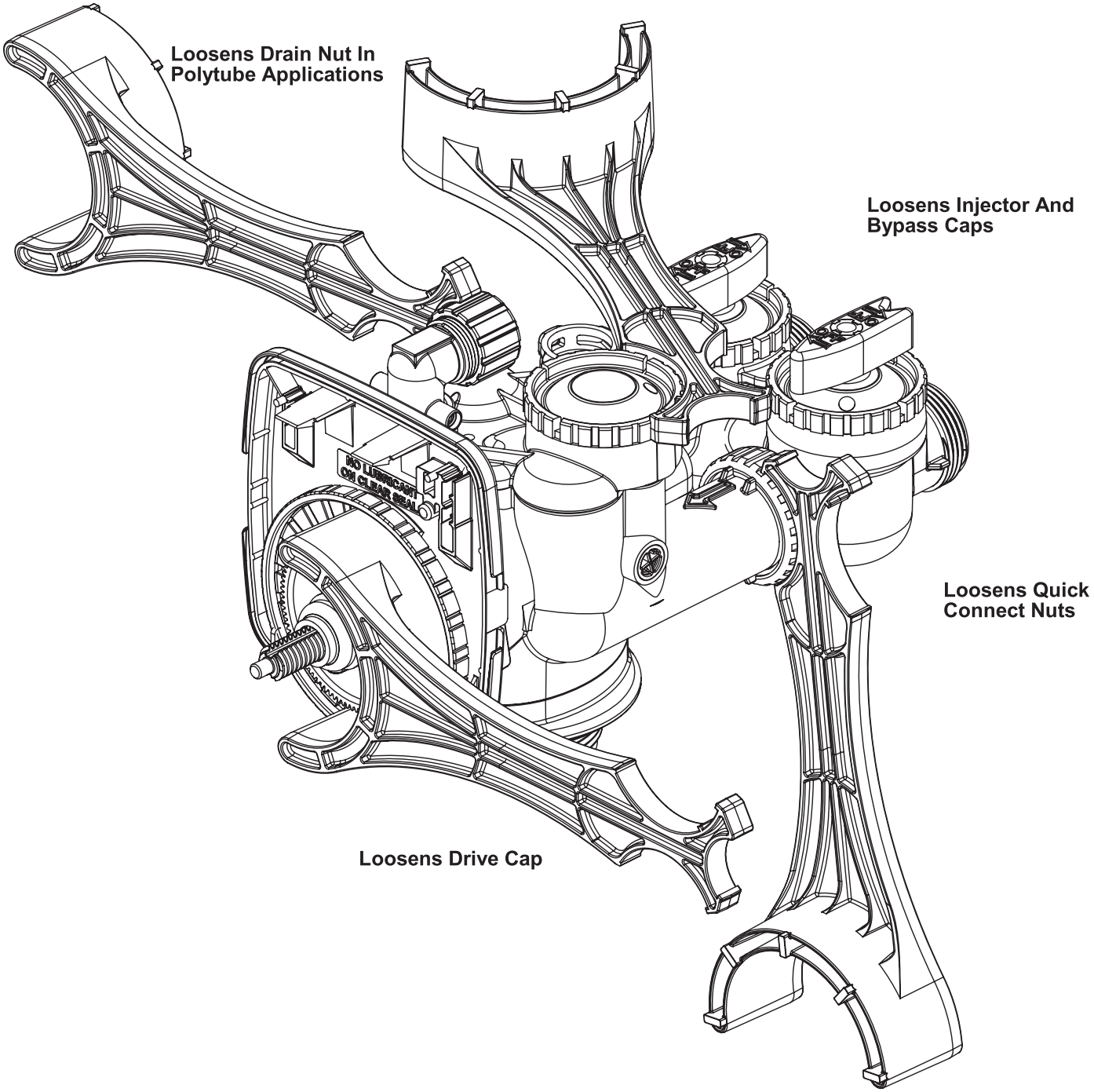
Bypass Valve

No.	Part No.	Description	Quantity
1	C3151	Nut 1" Quick Connect	2
2	C3150	Split Ring	2
3	C3105	O-Ring 215	2
4	C3145	Bypass 1" Rotor	2
5	C3146	Bypass Cap	2
6	C3147	Bypass Handle	2
7	C3148	Bypass Rotor Seal Retainer	2
8	C3152	O-ring 135	2
9	C3155	O-ring 112	2
10	C3156	O-ring 214	2



Wrench

Although no tools are necessary to assemble or disassemble the valve, the wrench (shown in various positions on the valve) may be purchased to aid in assembly or disassembly.


Loosens Drain Nut In Polytube Applications
Loosens Injector And Bypass Caps
Loosens Quick Connect Nuts
Loosens Drive Cap
NO LUBRICANT ON CLEAR SEAL

Drive Assembly

Remove the valve cover to access the drive assembly.

Disconnect the power source plug (black wire) from the PC board prior to disconnecting the motor or water meter plugs from the PC board. The motor plug connects to the two-pin jack on the left-hand side of the PC board. The power source plug connects to the four-pin jack. The four-pin jack is between the two-pin and three-pin jacks. The water meter plug (gray wire) connects to the three-pin jack on the far right-hand side of the PC board.

The PC board can be removed separately from the drive bracket but it is not recommended. Do not attempt to remove the display panel from the PC board. Handle the board by the edges. To remove the PC board from the drive bracket, unplug the power, water meter and motor plugs from the PC board. Lift the middle latch along the top of the drive bracket while pulling outward on the top of the PC board. The drive bracket has two plastic pins that fit into the holes on the lower edge of the PC board. Once the PC board is tilted about 45° from the drive bracket it can be lifted off of these pins. To reinstall the PC board, position the lower edge of the PC board so that the holes in the PC board line up with the plastic pins. Push the top of the PC board towards the valve until it snaps under the middle latch, weave the power and water meter wires into the holders and reconnect the motor, water meter and power plugs.

The drive bracket must be removed to access the drive cap assembly and pistons or the drive gear cover. It is not necessary to remove the PC board from the drive bracket to remove the drive bracket. To remove the drive bracket start by removing the plugs for the power source and the water meter. Unweave the wires from the side holders. Two tabs on the top of the drive back plate hold the drive bracket in place. Simultaneously lift the two tabs and gently ease the top of the drive bracket towards your body. The lower edge of the drive bracket has two notches that rest on the drive back plate. Lift up and outward on the drive bracket to disengage the notches.

To reassemble seat the bottom of the drive bracket so the notches are engaged at the bottom of the drive back plate. Push the top of the drive bracket towards the two latches. The drive bracket may have to be lifted slightly to let the threaded piston rod pass through the hole in the drive bracket. Maintain a slight engaging force on top of the drive bracket while deflecting the bracket slightly to the left by pressing on the side of the upper right corner. This helps the drive gears mesh with the drive cap assembly. The drive bracket is properly seated when it snaps under the latches on the drive back plate. If resistance is felt before latching, then notches are not fully engaged, the piston rod is not in hole, the wires are jammed between the drive bracket and drive back plate, or the gear is not engaging the drive cap assembly.

To inspect drive gears, the drive gear cover needs to be removed. The drive gear cover is held in place on the drive bracket by three clips. The largest of the three clips is always orientated to the bottom of the drive bracket. Before trying to remove the drive gear cover, the drive bracket must be removed from the drive back plate. The drive gear cover can be removed from the drive bracket without removing the motor or the PC board. Simultaneously, push in and down on the large clip at the bottom and the clip on the left-hand side of the drive bracket behind the PC board. Keep your other fingers behind the drive gear cover so the drive gears do not drop on the ground.

Replace broken or damaged drive gears. Do not lubricate any of the gears. Avoid getting any foreign matter on the reflective coating because dirt or oils may interfere with pulse counting. The drive gear cover only fits on one way, with the large clip orientated towards the bottom. If all three clips are outside of the gear shroud on the drive bracket the drive gear cover slips easily into place.

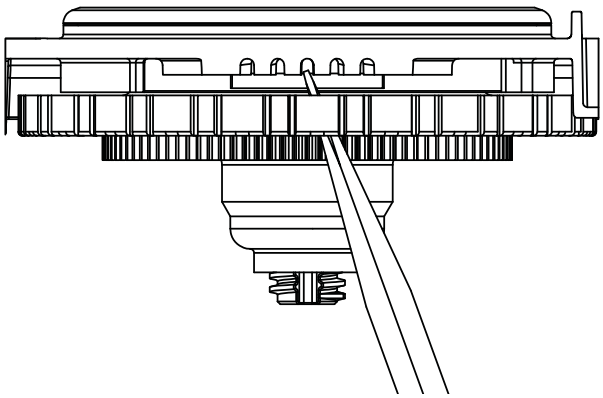
The drive bracket does not need to be removed from the drive plate if the motor needs to be removed. To remove the motor, disconnect the power and motor plugs from the jacks on the PC board. Move the spring clip loop to the right and hold. Rotate the motor at least a 1/4 turn in either direction before gently pulling on the wire connectors to remove the motor. Pulling directly on the wires without rotating the motor may break the wires off the motor.

Replace the motor if necessary. Do not lubricate the motor or the gears. When reinstalling the motor gently turn the motor while inserting so that the gear on the motor meshes with the gears under the drive gear cover and the small plastic bulge engages one of the slots on the motor housing. Reconnect the motor plug to the two pronged jack on the lower left hand side of the PC board. If motor will not easily engage with drive gear when reinstalling, lift and slightly rotate motor before reinserting.

Replace the valve cover. After completing any valve maintenance, press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (black wire) and plug back in. This resets the electronics and establishes the service piston position. The display should flash all wording, then flash the soft ware version (e.g. 154) and then reset the valve to the service position.

Drive Cap Assembly, Main Piston & Regenerant Piston

The drive assembly must be removed to access the drive cap assembly. The drive cap assembly must be removed to access the piston(s). The drive cap assembly is threaded into the control valve body and seals with an o-ring. To remove the drive cap assembly use the special plastic wrench or insert a 1/4" to 1/2" flat bladed screwdriver into one of the slots around the top 2" of the drive cap assembly so it engages the notches molded into the drive back plate around the top 2" of the piston cavity. The notches are visible through the holes. Lever the screwdriver so the drive cap assembly turns counter clockwise. Once loosened unscrew the drive cap assembly by hand and pull straight out.



The drive cap assembly contains the drive cap, the main drive gear, drive cap spline, piston rod and various other parts that should not be dissembled in the field. The only replaceable part on the drive cap assembly is the o-ring. Attached to the drive cap assembly is the main piston (down flow or up flow) and if a regenerant is used, a regenerant piston.

The regenerant piston (the small diameter one behind the main piston) is removed from the main piston by unsnapping it from its latch. Chemically clean in dilute sodium bisulfite or vinegar or replace the regenerant piston if needed. To remove the main down flow or up flow piston fully extend the piston rod and then unsnap the main piston from its latch by pressing on the side with the number. Chemically clean in dilute sodium bisulfite or vinegar or replace the main piston.

Reattach the main piston to the drive cap assembly. Reattach the regenerant piston (if needed) to the main piston. Do not lubricate the piston rod, main piston or regenerant piston. Lubricant will adversely affect the red or clear lip seals. Reinsert the drive cap assembly and piston into the spacer stack assembly and hand tighten the drive cap assembly. Continue to tighten the drive cap assembly using a screwdriver as a ratchet until the black o-ring on the spacer stack assembly is no longer visible through the drain port. Excessive force can break the notches molded into the drive back plate. Make certain that the main drive gear still turns freely. The exact position of the piston is not important as long as the main drive gear turns freely.

Reattach the drive assembly to the control valve and connect all plugs. After completing any valve maintenance, press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (black wire) and plug back in. This resets the electronics and establishes the service piston position. The display should flash all wording, then flash the soft ware version (e.g. 154) and then reset the valve to the service position.

Stack Spacer Assembly

To access the spacer stack assembly remove the drive assembly, drive cap assembly and piston. The spacer stack assembly can be removed easily without tools by using thumb and forefinger. Inspect the black o-rings and red or clear lip seals for wear or damage. Replace the entire stack if necessary. The spacer stack assembly has been 100% tested at the factory to insure proper orientation of one way seals. Do not disassemble the stack.

The spacer stack assembly may be chemically cleaned (dilute sodium bisulfite or vinegar) or wiped with a soft cloth.

The spacer stack assembly can be pushed in to the control valve body bore by hand. Since the spacer stack assembly

can be compressed it is easier to use a blunt object (5/8" to 1-1/8" in diameter) to push the center of the assembly into the control valve body. The assembly is properly seated when at least four threads are exposed (approximately 5/8"). Do not force the spacer stack assembly in. The control valve body bore interior can be lubricated with silicone to allow for easy insertion of the entire stack. Do not use silicone or any other type of lubricant on the red or clear lip seals or the piston.

Reattach the drive cap assembly and piston(s) and the drive assembly.

After completing any valve maintenance, press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (black wire) and plug back in. This resets the electronics and establishes the service piston position. The display should flash all wording, then flash the software version (e.g. 154) and then reset the valve to the service position.

Injector Cap, Screen, Injector Plug & Injector

Unscrew the injector cap and lift off. Loosen cap with special plastic wrench or pliers if necessary. Attached to the injector cap is a screen. Remove the screen and clean if fouled.

The plug and/or injector can be pried out with a small screwdriver. The plug can be wiped clean. If the plug leaks replace the entire plug. The injector consists of a throat and a nozzle. Chemically clean the injector with vinegar or sodium bisulfite. The holes can be blown out with air. Both pieces have small diameter holes that control the flow rates of water to insure that the proper concentration of regenerant is used. Sharp objects, which can score the plastic, should not be used to clean the injector. Scoring the injector or increasing the diameter of the hole could change the operating parameters of the injector.

Two holes are labeled DN and UP. Check for compliance with one of the following:

a. for downflow systems, the appropriate size injector is located in the “DN” hole, a plug is in the “UP” hole and that the piston is a combination of the downflow main piston and the regenerant piston;

b. for upflow systems, the appropriate size injector is located in the “UP” hole, a plug is in the “DN” hole and that the piston is a combination of the upflow main piston and the regenerant piston; or

c. for backwash only systems, a plug is in the “DN” hole and in the “UP” hole, and that the piston only has a downflow main piston (the regenerant piston must be removed) and a plug is in the refill flow control position.

Push the plug(s) and/or injectors firmly in place, replace the screen and hand tighten the injector cap.

Refill Flow Control Assembly or Refill Port Plug

To clean or replace the refill flow control, pull out the elbow-locking clip and then pull straight up on the elbow. Replace the elbow locking clip in the slot so that it is not misplaced. Twist to remove the white flow control retainer. The flow control can be removed by prying upward through the side slots of the retainer with a small blade flat screwdriver.

Chemically clean the flow control or the white flow control retainer using dilute sodium bisulfite or vinegar. Do not use a wire brush. If necessary, replace the flow control, o-ring on the flow control retainer, or the o-ring on the elbow.

Reseat the flow control so the rounded end is visible in the flow control. Reseat the white flow control retainer by pushing the retainer into the elbow until the o-ring seats. Remove locking clip, push down on elbow to reseat and insert locking clip.

Do not use Vaseline, oils, or other unacceptable lubricants on o-rings. A silicon lubricant may be used on the o-ring on the elbow or the white retainer.

Water Meter or Meter Plug

The water meter assembly is connected to the PC board by a wire. If the entire water meter assembly is to be replaced, remove the control valve cover and remove the power source and water meter plugs from the PC board. Unlatch the drive assembly and lean it forward. Unthread the water meter wire from the side of the drive assembly and through the drive back plate. To reinstall, rethread the water meter wire through the drive back plate and the side of the drive assembly. Reattach the drive assembly and the water meter and power plugs.

If a water meter wire is not visible, then a plug is installed not a water meter.

The water meter wire does not need to be removed from the PC board if the water meter is only being inspected and cleaned. To remove the water meter assembly, unscrew the meter cap on the left side of the control valve. Pliers may be used to unscrew the nut if necessary.

With the nut removed, a slot at the top of the water meter is visible. Twist a flat blade screwdriver in the slot between the control valve body and the meter. When the meter is part way out it is easy to remove the water meter from the housing. Once the water meter is removed from the control valve body, use your fingers to gently pull forward on the turbine to remove it from the shaft.

Do not use a wire brush to clean. Wipe with a clean cloth or chemically clean in dilute sodium bisulfite or vinegar. The turbine can be immersed in the chemical. Do not immerse electronics. If the turbine is scored or damaged or the bearings on the turbine are worn replace the turbine.

Do not lubricate the turbine shaft. The turbine shaft bearings are prelubricated. Do not use Vaseline, oils, or other unacceptable lubricants on the o-ring. A silicon lubricant may be used on the black o-ring.

Snap the turbine on the shaft and reinsert the water meter into the side slot. Hand tighten the nut. Do not use a pipe wrench to tighten nut.

Bypass Valve

The working parts of the bypass valve are the rotor assemblies that are contained under the bypass valve caps. Before working on the rotors, make sure the system is depressurized. Turn the red arrow shaped handles towards the center of the bypass valve and back to the arrow direction several times to ensure rotor is turning freely.

The nuts and caps are designed to be unscrewed or tightened by hand. If necessary a pliers can be used to unscrew the nut or cap. Do not use a pipe wrench to tighten or loosen nuts or caps. Do not place screwdriver in slots on caps and/or tap with a hammer.

To access the rotor, unscrew the cap and lift the cap, rotor and handle out as one unit. Twisting the unit as you pull it out will help to remove it more easily. There are three o-rings: one under the rotor cap, one on the rotor stem and the rotor seal. Replace worn o-rings. Clean rotor. Reinstall rotor.

When reinstalling the red arrow handles be sure that:

1. O-rings on both rotors face to the right when being viewed from the front of the control valve when the handle pointers are lined up with the control valve body arrows; or

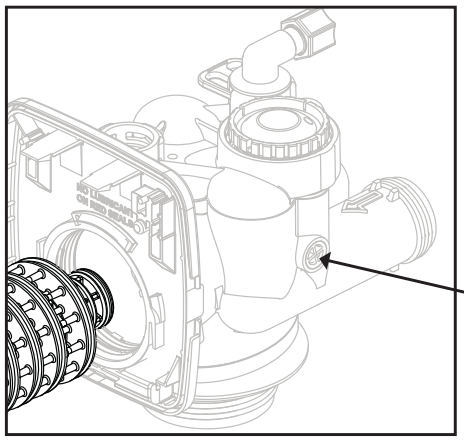
2. Arrows point toward each other in the bypass position.

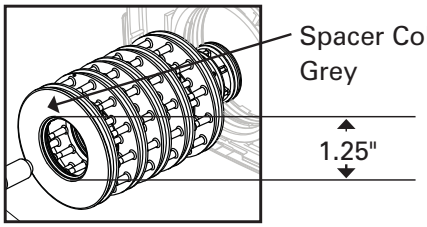
Since the handles can be pulled off, they could be accidentally reinstalled 180° from their correct orientation. To install the red arrow handles correctly, keep the handles pointed in the same direction as the arrows engraved on the control valve body while tightening the bypass valve caps.

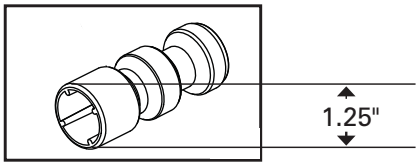
After completing any valve maintenance, press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (black wire) and plug back in. This resets the electronics and establishes the service piston position. The display should flash all wording, then flash the software version (e.g. 154) and then reset the valve to the service position.

Valve Identification

1" Valve with 1.05" Distributor Tube Opening Identification

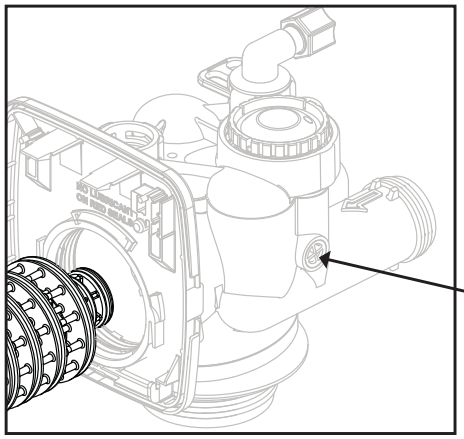


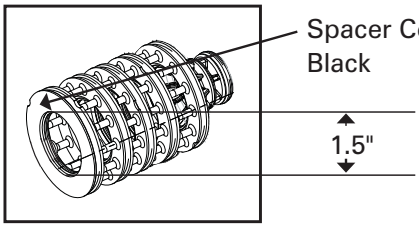


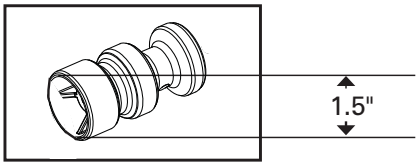


Note: The *downflow* piston is a solid amber color. The *upflow* piston is black and amber.

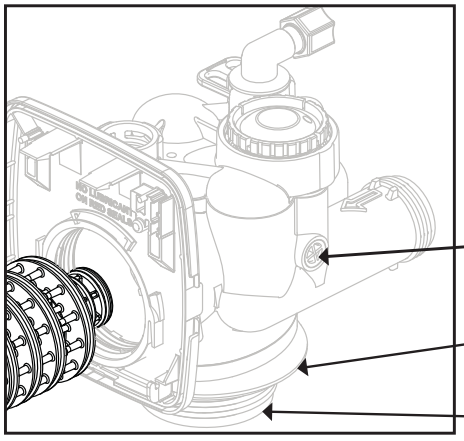
1¼" Valves with 1.32" Distributor Tube Opening Identification

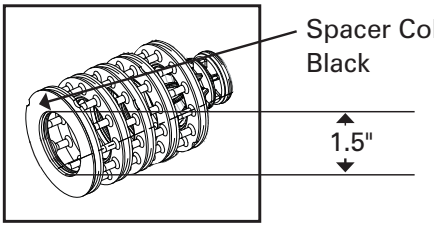


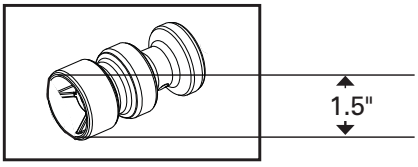




1¼" Valves with 32mm Distributor Tube Opening Identification







Timer does not display time of day	a. Transformer unplugged	a. Connect power
	b. No electric power at outlet	b. Repair outlet or use working outlet
	c. Defective transformer	c. Replace transformer
	d. Defective PC board	d. Replace PC board
Timer does not display correct time of day	a. Switched outlet	a. Use uninterrupted outlet
	b. Power outage	b. Reset time of day
	c. Defective PC board	c. Replace PC board
No softening/filtering display when water is flowing	a. Bypass valve in bypass position	a. Put bypass valve in service position
	b. Meter connection disconnected	b. Connect meter to PC board
	c. Restricted/stalled meter turbine	c. Remove meter and check for rotation or foreign material
	d. Defective meter	d. Replace meter
	e. Defective PC board	e. Replace PC board
Control valve regenerates at wrong time of day	a. Power outages	a. Reset control valve to correct time of day
	b. Time of day not set correctly	b. Reset to correct time of day
	c. Time of regeneration incorrect	c. Reset regeneration time
	d. Control valve set at "on 0" (immediate regeneration)	d. Check control valve set-up procedure regeneration time option
	e. Control valve set at NORMAL + on 0	e. Check control valve set-up procedure regeneration time option
5. ERROR followed by code number Error Code 1001 - Unable to recognize start of regeneration Error Code 1002 - Unexpected stall Error Code 1003 - Motor ran to long, timed out trying to reach next cycle position Error Code 1004 - Motor ran to long, timed out trying to reach home position If other Error Codes display contact the factory.	a. Control valve has just been serviced	a. Press NEXT and REGEN for 3 seconds or unplug power source jack control valve control valve
	b. Foreign matter is lodged in control valve	b. Check piston and spacer stack assembly for foreign matter
	c. High drive forces on piston	c. Replace piston(s) and spacer stack assembly
	d. Control valve piston not in home position	d. Press NEXT and REGEN for 3 seconds or unplug power source jack (black wire) and plug back in to reset control valve
	e. Motor not inserted fully to engage pinion, motor wires broken or disconnected, motor failure	e. Check motor and wiring. Replace motor if necessary
	f. Drive gear label dirty or damaged, missing or broken gear	f. Replace or clean drive gear
	g. Drive bracket incorrectly aligned to back plate	g. Reseat drive bracket properly
	h. PC board is damaged or defective	h. Replace PC board
	i. PC board incorrectly aligned to drive bracket	i. Ensure PC board is correctly snapped on to drive bracket

6. Control valve stalled in regeneration	a. Motor not operating	a. Replace motor
	b. No electric power at outlet	b. Repair outlet or use working outlet
	c. Defective transformer	c. Replace transformer
	d. Defective PC board	d. Replace PC board
	e. Broken drive gear or drive cap assembly	e. Replace drive gear or drive cap assembly
	f. Broken piston retainer	f. Replace drive cap assembly
	g. Broken main or regenerant piston	g. Replace main or regenerant piston
7. Control valve does not regenerate automatically when REGEN button is depressed and held	a. Transformer unplugged	a. Connect transformer
	b. No electric power at outlet	b. Repair outlet or use working outlet
	c. Broken drive gear or drive cap assembly	c. Replace drive gear or drive cap assembly
	d. Defective PC board	d. Replace PC board
8. Control valve does not regenerate automatically but does when REGEN button is depressed	a. By-pass valve in bypass position	a. Put bypass valve in normal operation position
	b. Meter connection disconnected	b. Connect meter to PC board
	c. Restricted/stalled meter turbine	c. Remove meter and check for rotation or foreign matter
	d. Defective meter	d. Replace meter
	e. Defective PC board	e. Replace PC board
	f. Set-up error	f. Check control valve set-up procedure
9. Time of day flashes on and off	a. Power has been out more than two hours, the transformer was unplugged and then plugged back into the wall outlet, the transformer plug was unplugged and then plugged back into the board or the NEXT and REGEN buttons were pressed to reset the valve.	a. Reset the time of day

Information contained herein is believed to be accurate at time of printing and is subject to change at any time.